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**A HISTORY
OF
THE ARMY ORDNANCE SERVICES**

A HISTORY OF THE ARMY ORDNANCE SERVICES

by
Arthur
MAJOR GENERAL A. FORBES C.B. C.M.G.

LATE R.A.O.C.

VOLUME TWO
MODERN HISTORY



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PART IV
THE CRIMEAN WAR TO THE
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CHAPTER XII

THE ARMY ORDNANCE DEPARTMENT

Section I. In relation to army administrative reforms

“THE English Ordnance Department goes back into older history than the army, of which it has since become a part. There were Master Generals and Boards of Ordnance centuries before there were Secretaries of State for War or Commanders-in-Chief. Begun under the Tudors the Board of Ordnance lived through the changes of the Great Rebellion, the Commonwealth, the Restoration and the Revolution, until it fell, at last, in the panic that followed the disasters of the Crimean War. It does not concern us now to enquire into the justness of the censure which, in 1855, terminated an organization which had driven the vessel of army administration, with the twin-screw of Crown and Parliament, through such long and varied storms; but if frequent seeking after new systems is an indication of weakness, the many alterations in administration that followed the abolition of the Board of Ordnance, through the last 30 years, can only be read as negative evidence in favour of the organization, and as positive proof that the machinery of effective Army Store administration has not yet been evolved from its ruins.”

This extract from the report of a War Office Committee of 1888–89 on Ordnance matters was probably penned by General Sir William Butler, a very able officer. Its special interest lies in the fact that every subsequent War Office reform, down to that of 1927 which subjects Ordnance services once more to a Master General of Ordnance, has been largely due to, and governed by, the need of improving “the machinery of effective Army Store administration.”

The late Colonel Markwick, R.A.O.C., once told me that Sir William Butler prophesied to him that, just as the Ordnance existed before the army, so it would be found in being long after armies had ceased to exist. Now that warfare is becoming such a pure science, with machinery replacing muscular effort, and assuming that

Sir William intended to include the fighting duties once (and now again) in charge of a Master General of Ordnance, this forecast, imaginative as it must have seemed at the time, becomes well within the realms of possibility.

* * * * *

The scandals and mismanagement attendant on the Crimean War bore as fruit a great series of reforms. 1855 was a year of protean upheaval, when the whole entangled mass of offices concerned with army administration was uprooted, and its off-shoots grafted on to one single stem. The Secretary of State for War, a Cabinet Minister, was made responsible for all civil work connected with the army. He took over militia business from the Home Secretary, and absorbed the office of the Secretary-at-War. The Master General and Board of Ordnance, which for centuries had played such an important part in the development of the empire, were abolished by Order in Council and their civil duties were vested in the Secretary of State.

The Board of General Officers disappeared, henceforth the soldier's clothing and appointments were provided by the State. The Commissariat was transferred from the control of the Treasury to that of the Secretary of State and a permanent Military Transport Corps created.

A main part of the business of this consolidated office comprised that of the Board of Ordnance whose premises and staff in Pall Mall it took over as a War Office, while the Commander-in-Chief with his military staff remained at the Horse Guards in Whitehall. The Clerk of the Ordnance, Mr. Monsell (Lord Ernly), remained at the head of the civil staff of the defunct Board until the next year when he was relieved by an Under Secretary of State with wider duties. The Controller and Principal Storekeeper was replaced by a Director General of Stores, and a Director General of Contracts was appointed. The Director General of Stores dealt with everything in the way of munitions and equipment for the army and administered the storekeeping staff of the old Board of

Ordnance. He prepared his own estimates ; and, when approved by Parliament, ordered what was to be provided either through the Director General of Contracts or from one or other of the Ordnance Factories. In 1857 the Storekeepers were formed into a Military Store Department. Clothing, which will be dealt with in the next chapter, had its own Director ; it will suffice here to say that it was no concern of this department except on service. The Secretary of State for War also had a Director General R.A. as technical adviser on armaments, inventions and other scientific matters, engineering services being represented by an Inspector General of Fortifications, and naval armaments by a Director General of Naval Artillery.

The next step, in 1861, was to make the Commander-in-Chief responsible for land armaments while the Factories continued to be administered by the War Office under a Director General of Ordnance who replaced the Director General R.A. as technical adviser to the Minister of War. This change completely severed civil and military work connected with the maintenance of armaments—the Secretary of State being responsible for the former and the Commander-in-Chief for the latter.

Next, in 1863, the Barrackmasters were removed from the control of the Director General of Stores, a new War Office post, that of Director of Barrack Department, being created.

It is beyond dispute that this consolidation of offices represented, in broad conception, an immense advance. But the new system soon disclosed an unlooked for weakness, namely, that the intimate relationship which hitherto existed between user and provider was lost. It had been left to the colonel, as the father of his regiment, to furnish all it needed, with nothing more than a general supervision by the Adjutant General assisted by a Board of General Officers. Now the only link between the regiment and those who equipped and clothed it was that between the Commander-in-Chief and Secretary of State. It was the same with the gunners and engineers who now formed a part of the army.

The Respective Officers were abolished, the family tie was broken, and the Military Store Officer no longer furnished without question anything needed to maintain fortifications or armaments.

Instead of pulling together, they pulled in opposite directions. Each served a different master. One owed allegiance to the Horse Guards, the other to the War Office.

The army lost all sense of responsibility for its economical administration. The regiment had no motive for economy when its colonel's vested interests lapsed. There was no longer a Master General and Board of Ordnance to act as guardian and chide its wards if they exceeded the allowance it chose to make them. Instead there was only that abstract entity, the Public Purse, which has always been a fair mark for anyone to shoot at. Efficiency became the sole watchword of the Commander-in-Chief, economy the business of the War Office.

In one way this was all to the good. The army discovered a hundred and one wants that the regiment had perforce to dispense with in the past, or make good itself. The State was unable to resist pressure in the same way as the Board of Ordnance or colonel. Instead of having nothing beyond the barest essentials necessary in time of peace, the army little by little acquired a substantial scale of equipment and of materials to keep it in order.

The private soldier in particular benefited. Ours was an army of volunteers and had to compete for recruits with other occupations in the labour market. The old senseless plan of raising troops by bounty money, which was promptly squandered, was abandoned. The recruit was given instead a free outfit of necessities when he joined. Barracks were improved, means of education and recreation were provided, and the soldier's welfare was studied. One after another articles which the soldier had to find from his pay were transferred from the scale of necessities to those of clothing and equipment provided free. The moral tone of the army was raised, a higher class was attracted to the ranks and military crime

diminished. The Prussian system which exalted the drill sergeant, and converted men into machines, with no other duty than to perform accurately a series of complicated evolutions, gradually disappeared. The soldier, as a respectable citizen, was capable of imbibing a higher conception of his duty. More reliance could be placed on the individual, and initiative replaced blind obedience.

The other result was that army administration became enormously centralized in London. There were no elaborate scales and regulations such as now exist; they had not been needed under the more paternal government of the past. Thus it was only by documentary evidence that the Commander-in-Chief could ensure that units were properly equipped, while the War Office needed similar evidence to check extravagance on the part of its representatives at outstations.

The volume of detail dealt with between these two offices is astounding. The Commander-in-Chief had an army of D.A.G.'s, D.Q.M.G.'s and clerks to examine every return connected with the services of supply. At the War Office, not a quarter of a mile away, Directors charged with the duty of providing for the troops checked the same documents all over again. Every indent from every unit in Great Britain had to bear the imprimatur of both offices before being approved.

Abroad, the officer in command at the station had the discretionary power of ordering the store officer to issue; there, no doubt, matters arranged themselves rather more simply than at home. But the general principle was the same everywhere. The Horse Guards was determined that the War Office should not allow the troops to go wanting. The War Office was resolved that the Horse Guards should not permit extravagance. Neither trusted the other nor its own subordinates at outstations.

To sum up, the result of the reforms was that the army gradually became far better equipped and clothed and consequently more efficient, but it had no longer any interest in economy and was ignorant of administration. The Horse Guards and War Office struggled day in and day out with a mass of details, and had to decide petty

local questions, on the merits of which they were not in a position to judge. The Commander-in-Chief and his staff, unable to surmount and escape from these entanglements, had no time to devote to large military problems. The Secretary of State for War was overburdened with work, the various branches of his office all coming direct to him for instructions.

It was to correct these defects and tortuous processes that what was known as the Control system was introduced. During the Fenian troubles of the 'sixties, the Commander-in-Chief in Ireland asked for the services of an official from the War Office to co-ordinate all that concerned the supply services and his request was acceded to. A Chief Controller was posted to the headquarter staff, and Controllers to each district, to whom units sent their demands. These the district Controller was empowered to approve, without reference elsewhere, if they were in order. He could then return one copy direct to the unit and the other to the depot from which supply was to be made. The A.G.'s and Q.M.G.'s offices were relieved of a mass of detailed work and the experiment proved a success.

It was then decided to adopt this plan elsewhere. But first there was much heated discussion whether to entrust stores and equipment to this new organization. The Director of Stores was strongly in favour of his department being left to work out its own salvation independently. Another suggestion was to separate munitions from other stores and equipment, to hand over the control of munitions to the Director General of Ordnance and revive the Respective Officers.

On the one hand it was argued that scientific qualifications were needed when dealing with munitions, that the Controller would be at the mercy of his specialized assistants, that stocks were for the navy as well as the army, that continental Powers kept munitions apart from everything else, and that the accumulation of so many and varied duties was a responsibility too great for one department.

On the other hand it was said that all supplies need custodians with special professional qualifications, that it was the custom in any business for the chief to rely for technical assistance on his subordinates, and that the continental plan had not been found over satisfactory by Prussia. It would be difficult to make a hard and fast line between munition stores and others. Duplication of patterns in closely allied articles would result. Great stress was laid on our insular position, and the fact that our campaigns would be conducted from an overseas base at which supplies of all sorts would have to be concentrated. In India there were Commissariat, Medical, Engineer, Ordnance, Marine and Land Transport Departments each holding its own stock of equipment. In expeditions to Persia and Abyssinia hopeless confusion had resulted owing to each being independent and competing for sea and land transport. The complete concentration of stores carried out at the Crimea had not been effected elsewhere. The Purveyor's branch, it was said, held an unnecessary accumulation of hospital equipment and transport for the sick. The Engineers had managed to keep their field train. The Barrack-master held too large a stock of barrack stores. This tendency must be checked. It had resulted in lamentable confusion in our small expedition to Canada, when no less than 224 telegrams were required in connection with the loading of one ship.

The Commissariat interests were the ones mainly represented on the committee appointed by the War Office to consider the best organization for the Control Department. It perhaps underrated the difficulties of the work of its fewer but more scientific colleagues of the Military Store Department. The views of the majority and the arguments in favour of consolidation prevailed.

The new arrangement was part and parcel of the great series of reforms of 1870, when Cardwell was Minister of War. Short service with the colours, followed by a term in the army reserve, was introduced which for the first time enabled the army to be expanded by means of trained soldiers in time of war. The purchase of officers'

commissions was abolished,¹ and a Military Secretary appointed to deal with their promotion, into which an element of selection for the first time entered. Work connected with the militia, yeomanry and volunteer corps was all centralized under the War Office to which the Horse Guards was united with a view to abolishing dual control. Regiments composed of single battalions were linked with others, relieving each other on foreign service, and the whole were grouped, with their affiliated militia, on a territorial basis, county titles replacing numerical ones. The Commander-in-Chief (who, however, remained with his military staff at the Horse Guards) was subordinated to the Secretary of State for War and two new appointments made, a Financial Secretary and Surveyor General of Ordnance. The latter was head of the new Control Department set up to deal with every-

¹ When, in 1855, the State undertook to equip and clothe the army, the value of an officer's commission ceased to depend on the income derived from this source and the colonel's pay was increased to compensate him for the profit he no longer enjoyed. After 1855 the connection between purchase and the provision of clothing, equipment or necessaries disappeared. It has, however, been necessary to refer so often to the ills attendant on purchase that the circumstances in which this old and firmly entrenched system received its *coup de grâce* are worth mention. The Bill introduced with that object by Mr. Gladstone's Government in 1870 only passed the House of Commons after a great struggle, to be defeated by the Lords. The system had its roots deeply embedded in the past, the sums paid for a step in rank were far in excess of those authorized, and officers feared the compensation it was proposed to pay them would not cover their outlay. Then the Government discovered a loophole through which it could carry through this most necessary reform despite Parliament. For a century and more the Crown had issued Warrants fixing the sums to be paid for each step in rank. What the Crown could do it could undo. The Queen was persuaded to sign a Royal Warrant cancelling that in force at the time and substituting no other. Parliament was furious but helpless. The act was clearly constitutional, and there was no more to be said. There was an outcry that the Crown was seeking to override Parliament, but it soon died down. Promotion from the ranks was simplified, and the class from which officers were drawn became more democratic.

Thus perished the fount and origin of all the crying evils to which army administration became heir when, under the Norman dynasty, monetary payment was first allowed to replace personal service.

thing connected with the supply services, including the Ordnance Factories.

The Secretary of State thus had three great departmental chiefs under him, the Commander-in-Chief responsible for MEN, the Financial Secretary for MONEY, the Surveyor General for MATÉRIEL. He no longer had to deal with numerous underlings, and the checking of documents twice over in Pall Mall and Whitehall ceased. The Surveyor General of Ordnance, an old title revived, had on his staff a Director of Supplies and Transport and a Director of Artillery and Stores, the latter replacing both the Director General of Ordnance and the Director of Stores.

The regulations for the Control Department bear date 1870, but the new system was then already working in some commands. The Controller was to conduct his business under the general officer whose adviser or agent he was, and to hold a position analogous to that of a staff officer. At the same time he was responsible to the Secretary of State that matters were governed strictly in accordance with regulations, and was not warranted in departing from them on his own initiative. Should the general issue orders inconsistent with War Office instructions, the Controller was respectfully to point out the inconsistency, and solicit special authority in writing. This was to be implicitly obeyed, but the Controller was to send an explanation, countersigned by the general, to the Secretary of State.¹

The Controller dealt with all financial matters in the district such as local contracts, the hiring of buildings and lands, etc. : and one branch of his office was concerned with such matters as had originally been the special province of the Commissariat under the Treasury. The other dealt with transport and supply services. The Controller in fact combined in himself the duties of Commissary General and Respective Officers except that

¹ Half-sheets of paper were to be used unless letters were long. It was Gladstone, the Prime Minister, who started this economy campaign in Government offices. If I recollect aright, he made a practice, when at Athens, of using old envelopes to send home despatches.

he had not the discretion that the latter enjoyed of arranging among themselves for the maintenance and repair of artillery matériel, forts and barracks. Instead of all indents being prepared in quintuplicate, one copy going to the War Office and one to the Horse Guards, the number of copies was reduced to two. These were sent direct to the Controller and, if in order, he approved and passed one copy to the executive officer whose duty it was to make issue and the other to the unit. Instead of making sure that the troops were properly clothed and equipped by examining indents and returns, the Commander-in-Chief was satisfied with periodical reports.

The staff of the Control Department was formed from that of the Commissariat, Military Transport, Military Store Department, Barrack Department and the Purveyor's Department (except the portion which provided a nursing staff in hospitals). The military elements in these branches were consolidated into one Corps which, appropriately enough, was named the Army Service Corps.

There were two branches to the executive. One was the Commissariat and Transport which dealt with food and forage, fuel and light, barrack and hospital services, and transport. The other was the Military Store Department which carried on its duties as in the past. Save that both were responsible to the same chief in the district instead of to different Directors at the War Office, executive work went on as before.

It was in the system of administration that the change mainly lay. The War Office made its first attempt to decentralize by sending each district one of its officials to act as adviser and settle on the spot any matters governed by regulation. It was hoped that in this way generals would cultivate an interest in economy, and study this aspect of any proposals they might put forward.

But this laudable result was not achieved. The plan threw too much power into the hands of the Control Department. Instead of the generals interesting themselves in administration the reverse occurred. It was the Controller who interested himself in military matters and vetoed what the general proposed to do. War Office

control might have been elaborate, but it was too far distant to be entirely effective. Also its decisions carried weight. Now it was replaced by the direct control of an omniscient subordinate on the spot whose rulings did not have such authority. Controllers were apt to be consequential; they could quote chapter and verse for everything, and talk glibly of mysteries such as army appropriations and votes. Generals resented being bossed by such high-handed personages and constantly told they could not do this and might not do that. They lost instead of gaining responsibility and complained that they were puppets in the hands of their Controllers. The very title lent itself to this view.

In 1876 this attempt to make the army share responsibility for its supply services was abandoned. The Control Department, the two main branches of which had never really amalgamated, was split in twain into the Commissariat and Transport, and the Ordnance Store Department, for so the Military Store Department was then re-christened. Each of these was again administered directly by its own chief at the War Office, where alone the supply services were co-ordinated by the Surveyor General of Ordnance.

Yet one benefit did result from this otherwise unsuccessful experiment. Scales of equipment were already beginning to be published more freely before 1870, the first set of equipment regulations having appeared in 1865. But the Controller had to deal with all store and financial matters, and during the six years that the system lasted a host of miscellaneous matters was legislated for by the War Office, even down to scales of books and games for transport ships. When therefore, in 1876, Controllers were abolished, the Ordnance officer was able, with his books of regulations, to deal with most of his ordinary daily problems. The extreme centralization of business existing prior to 1870 never reappeared.

Otherwise, except that the War Office and Horse Guards were no longer rival independent establishments, matters were much as they were after the reforms of

1855. Command and administration were again divorced. The army had not even the shadow of power it was granted by Control. Yet on service the army commander had to be responsible for the services of supply, at the very time when difficulties were greatest and unexpected problems bound to arise. The measure of his strength in war was that of his weakness in peace. The staff had no chance of learning by experience the administrative duties thrust upon it as soon as there was any serious work to be done.

This was essentially wrong and was generally felt to be so. There was only one way to put matters right, and that was to entrust to the army in peace the functions it performed had to assume in war. But to do so meant giving it the control of the Ordnance Store Department with its immense treasures of munitions, and this step the Government for long hesitated to take. Although the Commander-in-Chief had been subordinated to the Secretary of State for War, he was not a servant of Parliament to the same extent as the Surveyor General. He exercised his military command and patronage directly under the Sovereign. The power of the Crown had increased during the last years of the Prince Consort, a foreign Princeling, and any proposal to hand over to the Commander-in-Chief, a nominee of the Queen, all the arms and ammunition in the Kingdom was likely to awaken old echoes of conflict between the Crown and Parliament for control over the army.¹

Thus when, in 1881, Commissariat and Transport services (to which this objection did not apply) were transferred to the care of the Commander-in-Chief, Ordnance services remained under the civil side of the War Office, though the Ordnance Store Corps was placed under the Commander-in-Chief for matters of discipline.

¹ In this connection Ordnance depots may play an important part even in these days. When the Home Rule Bill of 1914 was before Parliament there was serious question whether the troops in Ireland could be trusted to coerce Ulster. "As all this peril grew, the small military posts in the North of Ireland, particularly those containing store of arms, became a source of preoccupation to the War Office."—*The World Crisis*, Winston Churchill.

Finally, in 1887, when another scheme of War Office reform was launched, the Government took the great plunge and handed over to the army its stocks of arms and ammunition; an important reason for the changes then made being as follows. The original idea was that the Surveyor General should be a distinguished soldier of rank and experience, selected for his administrative ability; a man, in fact, on a par with the great Master Generals of the past though not with a seat in the Cabinet. The first Surveyor General was a major general. Then, unfortunately, the post was made a political one. Its occupant constantly changed and was ignorant of the military side of the work. The Secretary of State lost his technical adviser and the Surveyor General was at the mercy of his Directors, who in turn were guided purely by departmental knowledge and experience. Each of these prepared his own estimates and the Surveyor General was not in a position to judge between their rival claims. In his mind financial and political considerations overshadowed all others. Each tried to get what he could, extravagant demands were met by arbitrary reductions, and there was no guarantee that the money voted by Parliament was laid out to the best advantage for the army as a whole.

In 1870 the War Office had been divided into three branches. In 1887 it was redivided into two and the post of Surveyor General abolished.

The Financial Secretary took over the purely civil business of the Surveyor General; the procuring of supplies for the army, with the Director of Contracts and the Ordnance Factories which, at the same time, were all made subject to a Director General at Woolwich.

The Commander-in-Chief took over the Surveyor General's military business; his supply duties, the custody of stocks and the staff to look after them. In addition to training and discipline he became responsible for the soldier's housing, feeding and equipment. This brought about what Control failed to do. It forced the military side of the War Office at the Horse Guards to take some interest in economy.

The Commander-in-Chief, with a certain sum at his disposal, had to decide how it should be allotted, what to infantry, what to cavalry with their horses, what to artillery with its costly equipment, what to ancillary services. He had to consider what was needed on account of fortifications and armaments, what on barracks and storehouses, what on transport, what on rifles, camp equipment or accoutrements. When proposals were to be considered which involved new expenditure it was he, and not a politician, who had to decide whether to take them up or turn them down according to their merits and what money was available. He prepared his own estimates, which were merely subject to general review by the Financial Secretary and approval by the Secretary of State.

With this change the Director of Artillery and Stores became a servant of the Commander-in-Chief with the new title of Director of Artillery. He was to provide (by demands on the Financial Secretary) and supply the army with all its stores and equipment and to administer the civil and military personnel of the Ordnance Store Department. But to these a new duty was added, that of inspecting munitions. Hitherto munitions had been examined by the Ordnance Factories, whether made by themselves or obtained from armament firms. It had on previous occasions been contended that it was wrong in principle to allow the manufacturer to pronounce judgment on his own goods and decide whether they were fit for service. The Admiralty already had its own officer to examine gun mountings. Now the Factories were on the civil side of the War Office, whereas the Director of Artillery was on the military side. This brought matters to a head. A Warlike Stores Inspection Division was formed from those engaged on such duties at Woolwich, Enfield and Waltham, subject to the Director of Artillery and independent of the Director General of Ordnance Factories. In 1893 an Inspection Division to deal with technical engineering equipments was added under the Inspector General of Fortifications.

Another result of this reorganization was immensely

important in its effect on Ordnance services. In bygone times the Board of Ordnance had never distinguished between the munitions it provided for land and sea service. They were all classified under the same vote, and all held on the same account. Some types of gun or ammunition might be suitable to only one service, but generally speaking they were common to both.

When the Board was abolished the same procedure continued. The munitions required by the navy were provided from army votes and purchased by the War Office. So long as a 64 pr. cast-iron gun costing £100 with a standing carriage was the biggest and most expensive used in either service this did not much matter. But now the navy had large-calibre built-up guns costing many thousands of pounds with elaborate mountings and costly ammunition. For some time past this had led to dissension between War Office and Admiralty, the former alleging that pressure by the latter was so great that it did not get its fair share. In other words, the navy was getting what it required at the expense of the army.

The question came to a head when the responsibility for preparing army estimates was allotted to the Commander-in-Chief. To prevent further complaint it was decided in 1888 that munitions for each service should be provided and accounted for separately. The monetary provision for Naval Ordnance stores was transferred *en bloc* to naval estimates, but the War Office continued to order what the Admiralty required, either from its Factories or from private armament firms.

It was next the turn of the navy to object. The Admiralty had to frame its programme of construction far in advance for complete units—ships, engines, armour, turrets and guns. It complained of being without sufficiently reliable information as to the progress of orders for munitions, which alone were dealt with by the War Office, whose forecasts might not be fulfilled. It was liable to find itself with men-of-war for which the guns were not ready. Also it was found to be contrary to the provisions of the Exchequer and Audit Act for the War Office to administer a naval vote.

By this time there were such essential differences between land and sea armaments that little was gained by combining orders, and it was therefore decided to make the Admiralty entirely responsible for its own munitions. This was effected by transferring to the navy a portion of the personnel, premises and stocks held by the Ordnance, and building up a separate Naval Ordnance Department subject to the Admiralty.

If the reader will refer to the beginning of Chapter IX he will find that the proposals made by Burke in his Bill of Economical Reform over a century before were thus at last consummated. The civil was subordinated to the military in 1887 and the separation of the land and sea establishments quickly followed. The Ordnance Store Department became a purely military organization.

The reforms of 1887 were accompanied by a more closely defined allocation of staff duties. At the War Office, the Adjutant General ceased to deal with routine matters affecting the soldier's personal effects. Such questions were transferred to the Quartermaster General who thus had charge of what may be called the household work, while the Adjutant General had only the military work to attend to such as training, discipline and recruiting.

Outside the War Office there had been no very regular division of staff duties. But now the army was accountable for stocks of immense value scattered in Ordnance depots throughout the Empire, the administration and control of which were vested in the officer in whose sphere of command they were located. A dual staff was therefore set up in each military district ; an " A " staff to do Adjutant General's, and a " B " staff for Quartermaster General's duties.

The army was now responsible for its own supply services subject only to rules drawn up in the interests of economy. For the Commissariat and Transport, now the Army Service Corps, the plan was ideal. Provision, inspection, storage and distribution were all in the hands of one Director subject to one principal staff officer, the Quartermaster General. This branch of the staff was

represented in every command with the same duties in war as in peace.

But Ordnance services furnished a much more difficult problem. Although smaller in volume they covered a far wider range and involved intricate matters connected with artillery and engineering equipments. To the Director of Artillery the Ordnance Department was but a side issue. He was responsible to the Commander-in-Chief for the efficiency of artillery and was his technical adviser on all gunnery questions and those affecting small arms. Patterns of engineering stores were in the hands of the Inspector General of Fortifications. Those of general equipment and inventions or trials connected therewith might be dealt with by the Q.M.G. or A.G. according to their nature. Moreover he had no counterpart in military districts where the Ordnance was still no one's child in particular. There was not the unity of control which existed in the other great supply service, nor the exact coincidence of staff responsibility in peace and war.

The reorganization of 1887 resulted in a much better distribution of duties. The Cardwell reforms of 1870 tended to divide the War Office into water-tight compartments, each carrying out its business independently; but now the military side had to look to the financial for the wherewithal to outfit the forces, while the financial side depended on the economical administration of the military to enable it to make both ends meet. Although not yet fully amalgamated, and though there was still often friction between Pall Mall and Whitehall, the two branches of the War Office were much more mutually interdependent.

So close, indeed, was now the relationship and so great the administrative responsibilities of the Commander-in-Chief's principal staff officers, that it was proposed in 1890 to adopt a fresh War Office organization. The heads of the great military departments were to be responsible for their work to the Secretary of State for War, while the Commander-in-Chief was to be converted into a Staff

Officer concerned with the preparation of plans of operation, training and intelligence. Germany had shown in her wars against Austria and France how important it was to have a General Staff highly educated in these duties which with us were badly neglected.

But the Government of the day actually feared that this would tend to promote rather than prevent war and moreover, with the Duke of Cambridge holding the post, it was difficult to take any step tending to lower the prestige of the Commander-in-Chief as head of the army.

This Royal Duke had been appointed to the position after the Crimean War, not because he was a distinguished soldier, but to emphasize the fact that the army served the Sovereign and not Parliament. Queen Victoria had seen many old attributes of Royalty one by one slip away. Our constitution was slowly but surely becoming more and more democratic, and the personal power of the Sovereign diminishing. But it was an unwritten law that the command of its army was vested in the Crown, and to this prerogative she clung with more tenacity than to any other. Of all the numerous reforms of her reign the one to which Victoria yielded with the least good-will was that which, in 1870, subordinated the Commander-in-Chief to the Secretary of State for War and Parliament. She regarded this step as an invasion of her most Sacred Right, and it was only the fact that her position as head of the army was thereby upheld that induced her so readily to sign the Warrant abolishing purchase, thus overriding her Parliament which had refused to pass a Bill introducing this reform. In reality she disliked the measure.¹

The Commander-in-Chief was the nominee of the Sovereign and the Queen could exercise her patronage over the army through the Duke of Cambridge. The universal veneration in which she was held in her old age would have made it very difficult to lower the status of

¹ See footnote, p. 10. After it was all over she wrote that "she must honestly own to Mr. Cardwell, that she sees with deep regret the destruction of a system which has worked well for so long, and under which the British Army established its brilliant reputation."—*Letters of Queen Victoria*, second series, Vol. II, October 30th, 1871.

his office and convert him into a mere member of a Board presided over by a Minister of Parliament.

It was not till 1895 when the Duke of Cambridge, who had been Commander-in-Chief ever since 1858, was at last persuaded to retire, that any measure of this sort was attempted. A War Office Consultative Council was then formed, presided over by the Secretary of State, the members comprising his principal civil assistants, the Commander-in-Chief and the heads of the military departments, viz.: Adjutant General, Quartermaster General, Inspector General of Fortifications and Inspector General of Ordnance—for so the Director of Artillery was then re-christened.

The Commander-in-Chief was to do no more than generally supervise the work in these departments, and all five were to be co-ordinately responsible to the Secretary of State for War. Incidentally this brought the Inspector General of Ordnance into a more powerful position which was still further enhanced in 1899, when his style was changed to that of Director General of Ordnance and he was made responsible for the Ordnance Factories and the Clothing Department, both hitherto under the civil side of the War Office.

This attempt to convert the War Office into a Board of Directors was not a success. The Duke of Cambridge, whose ideas were based on the traditions of Waterloo, had been nominally all-powerful, while Lord Wolseley, his successor, a most distinguished soldier with up-to-date ideas, was granted only a vague over-lordship over military affairs; and during the South African War there was considerable tension between him and the Secretary of State, each contending that the other was overriding his functions.

It was not until 1904, when reorganization followed from the experience of the South African War, that the War Office was really converted into a Council and steps taken to amalgamate and lodge the whole of its staff in one new building in Whitehall.¹

¹ The statue of the Duke of Cambridge, opposite his old home at the Horse Guards, frowns haughtily on the new War Office with which in bygone times he had so many squabbles.

The Commander-in-Chief had long ceased effectively to command the army ; he was nothing more than the ex-officio head of the military departments of the War Office. The title was anomalous and was abolished. He was replaced by an Inspector General of the Forces on whose staff, among others, was an Inspector of Army Ordnance Services, a senior officer of the department whose duty it was to tour round Ordnance establishments and report on their efficiency and economical management:

The staff of the War Office was entirely reconstituted and an Army Council formed representing every interest, military and civil. The President of the Council was the Secretary of State for War, and the permanent Secretary of the War Office, a non-political post, acted as its Secretary. The members comprised the Chief of the General Staff, Adjutant General, Quartermaster General, Master General of Ordnance, the Financial Secretary and Parliamentary Under Secretary.

The principle of having a General Staff charged with the preparation of plans of war, strategy, intelligence and training was only then adopted. In the days of Marlborough and Wellington such duties had been carried out by the Quartermaster General ; but since then he had become little more than the glorified head of the Army Service Corps.

The member in Council for whom the old title of Master General of Ordnance was revived was to be the manufacturer, or provider on demand, of all Ordnance stores properly so called—ordnance, arms, ammunition and all articles of military equipment which the Ordnance Factories could make. As subordinates he had Directors of Artillery and of Fortifications and Works. He controlled the Ordnance Factories with their Artillery and Engineer inspection staff. The annual vote in army estimates for Ordnance services was split in twain, and that portion which referred to the above services was administered by the Master General.

With this exception the whole work of the Ordnance fell to the Quartermaster General under whom a new War

Office post, that of Director of Equipment and Ordnance Stores, was created. The D.E.O.S. was charged with the duty of supplying the army with everything in the way of munitions, stores and equipment, with the custody of all stocks, repairs and maintenance, and with the administrations of the personnel of the Department and Corps. In addition he provided and inspected everything except technical equipment, administering that portion of the vote which did not rest with the Master General of Ordnance.¹

"The greatest change affecting the Q.M.G." (so reads the report of the Esher Committee on whose recommendations this reorganization took place) "which we urge is the transfer of the Army Ordnance Department to this branch. In the field the Q.M.G. must be charged with the transport of stores of all kinds. At present he has charge in peace, and in war, of supplies, but equipment and Ordnance stores are, in peace, under the charge of the Director General of Ordnance whose branch is represented by the Army Ordnance Corps in the field. Barrack stores, however, are held and issued by the Q.M.G. We consider that the only logical arrangement is to make the Q.M.G. the holder and issuer of all military stores in peace and war. Provided that a good administrator is appointed as D.E.O.S. we do not admit that the Q.M.G. will be overburdened. . . . The head of the Corps should be at the War Office."²

There were other changes. Transport and com-

¹ This separation between the Master General of Ordnance and the Army Ordnance Department was apt to confuse the lay mind. In the winter of 1914-15, when there was such a shortage of ammunition in France, the Northcliffe press appeared with scare headlines describing what it was pleased to term the failure of the Ordnance Department. Needless to say the Army Ordnance Department was not concerned with the provenance of munitions.

² Admiral Fisher was one of the triumvirate on whose recommendations the Army Council was formed. "Vote for Plumer and a full belly," he wrote in his breezy style, "every vote given against Plumer is a vote for paper boots and no ammunition." Plumer was appointed Q.M.G. He was also insistent that the heads of branches be styled Directors and not have staff titles such as D.A.Q.M.G.—*Memories* by Admiral of the Fleet Lord Fisher.

missariat supplies were separated. Transport and remounts were amalgamated under one Director, food-stuffs and clothing under another. But two years later the provision and supply of clothing was transferred to the D.E.O.S.; and commissariat supplies were re-amalgamated with transport.

The Directorate of Contracts, a civil branch, was abolished. There was an impression that this office was too much of a bureaucracy, merely placing orders for what the military side wanted and insufficiently in touch with either the nature of the goods or the firms it dealt with. Complaints on this score during the South African War were certainly to some extent justified. The office was apt automatically to accept the lowest tender, regardless of whether the firm given the order was in a position to execute it properly by the specified date. When it failed to do so the Director of Contracts did little beyond sending one reminder after another, each on a printed form expressing greater urgency than its predecessor.

Sir Henry Brackenbury, who was Director General of Ordnance during the war in South Africa, had insisted very strongly that if he was to be held responsible for supplying the army he must be in a position to procure what he wanted. It was claimed that the M.G.O. and Q.M.G. were in a better position to place their own orders on the trade in view of their more specialized experience and knowledge of the degree of urgency and importance. The staff of the Director of Contracts was therefore split up between these two branches.

A better step would have been to strengthen the Directorate of Contracts. A line must be drawn somewhere between manufacture and supply, and while the latter should certainly be a military duty, the army can and should be relieved of the work of purchase. The Director of Contracts is the War Office wholesale buyer. He should be equipped with a knowledge of the world's markets, of trade combines, trade union practice, factory legislation and contractual law. He should be in touch with the buying agents of the Admiralty and other Government departments dealing in similar lines of goods.

These are matters in which army-officers cannot specialize. Expert knowledge is certainly useful but not so essential. The expert comes in chiefly when the goods are delivered for inspection. Moreover the M.G.O. and Q.M.G. competed for the same class of goods.

In 1907 the Directorate of Contracts was revived and placed under the Finance Member of the Council, paving the way for the creation of a Ministry of Munitions in the Great War. In order that the M.G.O. and Q.M.G. should have their say in the matter, tenders, after being scheduled in the office of the Director of Contracts, were scrutinized by the Chief Inspector concerned and D.E.O.S.'s demanding officer. The former advised as to which offer should be accepted from a technical aspect, from his knowledge of the firm and price; the latter from the time aspect, having knowledge of the urgency.

At the same time as the Army Council was formed, the United Kingdom, in place of being parcelled out into numerous small districts, was re-divided into a few large commands. Each of these was commanded by a General of high standing with two principal staff officers. One corresponded to the Chief of the General Staff at the War Office, the other relieved the General of all detailed administrative work, having under him the Adjutant General and Quartermaster General's branches, and the heads of the Army Ordnance and other Departments in the command.

And so after many restless and storm-tossed wanderings, after seeking anchorage in many temporary and unsuitable havens, the Ordnance barque found port under the shelter of the Quartermaster General at the War Office and the administrative staff officer (Major General in charge of Administration) elsewhere, these being the officials responsible for supplying the army with every material want. On service indeed the co-relation of staff duties at the War Office and the seat of war was even closer. Then the administrative staff officer disappeared, and the Army Commander had his three principal staff officers, C.G.S., A.G. and Q.M.G., Ordnance services being a branch of the latter.

The principal landmarks of this period, from the point of view of Army Ordnance Services, can now be conveniently summarized.

Firstly came the consolidation in 1855 of all civil and supply services under a Secretary of State for War, accompanied by a great extension of the activities of the Ordnance Department, which became a servant of the whole army instead of providing little except for artillery and engineers.

Next were the reforms of 1870, which included the subordination of the Commander-in-Chief to the Secretary of State for War, and the creation of a Surveyor General of Ordnance to take charge of all work, civil and military, connected with every supply service. At the same time a measure of decentralization was attempted by attaching to each military district a representative of the Surveyor General with the title of Controller. But the General and Controller each served a different branch of the War Office and were antagonistic, with the result that the Control system failed; though otherwise the reforms introduced this year abided.

Thirdly, in 1887, the Surveyor General was abolished, and the Commander-in-Chief was made responsible for all military work connected with the supply services, from which the navy was excluded.

Lastly, in 1904, an Army Council was created, when for the first time the civil and military sides of the War Office were really amalgamated; and when the Army Ordnance Department and Corps was for the first time represented at the War Office by its own chief. At the same time the Control system was in essence revived, for the Major General in charge of Administration was in reality the Controller under another title. But now there was a complete fusion at the War Office, the General and his administrative staff officer no longer served different masters, both were soldiers, and friction was avoided.

It is interesting to compare the position of the two main supply services as a result of all these changes.

The last reorganization of the Army Service Corps was in 1887. Every link in its chain was then firmly riveted.

together, and the whole weight of the burden rested on the shoulders of its Director who in turn was supported by one principal staff officer at the War Office, the Quartermaster General. At every outstation its organization was a replica of that at the War Office. Rations comprised the main bulk of what the troops needed, there had to be a daily issue of the staff of life, and it controlled the means of distributing supplies.

Such a desirable result was not to be reached for Ordnance services even by the later reorganization of 1904. They then for the first time came under the Quartermaster General, in itself an immense advantage, as it was his particular duty to supply the army with every material want, in fact with practically everything except man-power. But the Committee on whose recommendation the Army Council was formed was unable to devise a scheme by which Army Ordnance Services should be administered from start to finish by one single staff officer, the Quartermaster General, or to cut them entirely adrift from the Master General of Ordnance with his Directors of Artillery and of Fortifications and Works. Demands for Ordnance stores were met in part by the D.E.O.S. and in part by the D. of A. and D.F.W., who were responsible for the pattern and inspection of what they provided.

Moreover the Ordnance was dependent on the Army Service Corps for the delivery of its goods to the troops. In the days of Wellington, and indeed till considerably later, there were excellent reasons for combining transport and commissariat duties. Then the soldier carried all his worldly possessions on his back; and, beyond a few rounds of ammunition, he needed practically nothing except his rations. For transport—wagons, horses and drivers—and for supplies—food and fuel—the army depended in the first instance on the country wherein it was operating. The broad distinction, in fact, was between these two affiliated services, mainly improvised in the theatre of operations, and Ordnance services, which had to be centrally controlled from England and which were chiefly confined to siege operations.

But by the twentieth century very different conditions were arising, and Napoleon's saying, that an army marches on its belly, was becoming out-of-date. True, the soldier still depended on his rations for his daily life, but to win battles he was beginning to need a great deal else. The Transport Officer naturally bent all his energies on seeing that ample supplies of food were forthcoming. It was not to be expected that he should view dispassionately demands for transport from extraneous sources.

Altogether Ordnance services were not as simple and homogeneous in structure as those controlled by the Army Service Corps. To hark back to the opening lines of this chapter, a perfect machinery of effective army store administration had not even yet been built up from the ruins of the Board of Ordnance.

Section II. Interior Economy

Immediately the scandals of the Crimea came to light the Board of Ordnance, so soon to be extinguished, set about putting its house in order by establishing a properly qualified inspection staff at the Tower. A Superintendent of Inspectors was appointed, assisted by four Inspectors to deal with different lines of goods, who were selected on account of their aptitude as buyers. Practical mechanics were engaged and set to work under the appropriate Inspector. To give tone to this new branch and signify its high and independent status, all the men were expected to wear frock coats and top-hats.

Contractors were no longer allowed to roam at will about the buildings discussing the merits and defects of their goods with the viewers. They had to seek an official interview with the Superintendent, from whose decision there was no appeal except to the War Office, as he was independent of the Military Store Officer at the Tower. Except for munitions, which were dealt with at Woolwich by artillery officers, the Superintendent was responsible for patterns and specifications, and articles remained in his custody until passed as fit for

service. Moreover stores were no longer allowed to lie for indefinite periods until the contractor could "persuade" some viewer to pass them. A limit of one month was imposed, and the seller was paid for each delivery instead of having to wait for his money till his order was completed.

Naturally there were at first complaints from contractors who were unused to having their goods judged by such a high and unbiased standard. But they seem to have been few in number and trivial in extent. This Inspection Branch quickly established for itself a high reputation, which it has ever since enjoyed, for skill and integrity. The army obtained goods of far better quality and at less cost. There was no longer bribery to fear and bills were paid promptly. In short purchase was placed on a proper business footing.

When, after a short period of transition, the store-keeping staff of the Board of Ordnance became the Military Store Department, its countenance assumed a very different complexion. It no longer provided bricks and mortar. The Inspector General of Fortifications dealt with barrack construction. After a few years it ceased to buy coal or oats for some colony where they were not to be had, such articles being dealt with by the Commissariat. But while it shed these accessories, and confined its attention to stores and equipment pure and simple, the Military Store Department was saddled with duties and responsibilities which the Storekeepers of the past had never been called on to undertake.

The backbone of the whole system, especially abroad, had been the Respective Officers, Boards of Ordnance in miniature, and their abolition left an aching void that was very hard to fill. The Storekeeper had been wont to rely on the C.R.A. and C.R.E. in technical matters, he was merely the accountant. The Respective Officers had dealt with everything affecting the interior economy of the station jointly. Between them they checked estimates, prepared the annual demand, examined accounts of cash and stock, conducted surveys and stock-

takings, discharged or engaged labour. They shared every responsibility. Now all this was jettisoned. The store officer, alone and friendless, had to deal with all such questions. He also became actively concerned with the army as a whole. Moreover it was at this very time that the age of scientific warfare dawned. Equipments, which in the past had been simple, continued from that day onwards to become increasingly intricate.

But if the store officer had to mourn the loss of his brethren, he was not left derelict as an orphan. The Department was under the care of a chief with direct access to a Cabinet Minister, one whose sole duty it was to attend to its wants and fit it for its enlarged duties. The task was set about with vigour, and during the next few years many new measures were put in hand.

The officers of the Military Store Department were given army commissions. They ceased to be bonded accountants, as if it were assumed they would prove dishonest. Extra clerks were provided so that they should have time to devote to technical matters. New entrants had to be educationally qualified and underwent a nine months' course of intensive culture at Woolwich. The officers were expected to acquire "a full and practical knowledge, not only of the various descriptions and proportions of military stores and munitions required for the several services, but also of the nature and qualities of the materials of which such stores and munitions are composed. It is only by these means that an efficient and intelligent body of officers can be formed." Future advancement was to depend on the extent and accuracy of their knowledge and each officer was to keep a note and remarks book which was to be called for yearly and examined by the Director of Stores.

It was indeed said the Military Store Officers knew more about guns and ammunition than those who used them.

Lists of changes in the patterns of warlike stores were circulated by means of which they could keep their knowledge up to date. Of these two sets appeared at intervals of six months in 1860. The next year there was a

quarterly edition, and from 1868 onwards a monthly one. This gives an indication of how rapidly changes began to occur. Marks were introduced to distinguish progressive types of the same nature of store.

A price list of the Tower stores was printed in 1866. Two years later a new edition, containing Woolwich items as well, appeared. Units were held accountable that the exact nomenclature shown in these vocabularies was used in their indents, which were to be submitted quarterly. Incidentally the term indent was replaced at this time by requisition. This was the phraseology of the Commissariat which obtained its supplies on service by impressment. That it came to be adopted was perhaps due to the absence of an Ordnance storekeeping staff at the Crimea.

The Military Store Officer was made responsible for the examination of stores purchased locally. This had been the duty of the Respective Officers as a whole. The yearly survey of the Respective Officers was replaced by one on which the War Office, Horse Guards and Admiralty were represented.

Another matter of great moment was the shifting of the centre of gravity from the Tower to Woolwich. Anyone who has visited the Tower will realize how ill-adapted it had become, under modern conditions, for an Ordnance depot. Space was far too restricted, and buildings unsuited for storage in bulk. It had no railway approach and no berth for anything bigger than a barge. In 1869 the Admiralty ceded the Dockyard at Woolwich to the War Office, and it was used to accommodate barrack stores, accoutrements and harness. By 1870 the Tower was practically abandoned for general stores, and its Inspectors moved to Woolwich. On the other hand, the small arm establishment at Birmingham was closed down and its contents removed to the Tower. Demands for arms went to the Tower, for powder to Purfleet, and for everything else to Woolwich. But this was when Control started and later in the same year all demands were ordered to be sent to the Controller at Woolwich. It will be convenient to continue this particular branch

of enquiry here. By 1887 small arms were transferred from the Tower to Weedon, which became the centre for demand and supply, directly under War Office control, while Purfleet remained subordinate to Woolwich. The Tower then became nothing more than a small Ordnance centre for troops in London and held old pattern arms and ancient armour.

It was also after the Crimea that Aldershot became an Ordnance station. A large hutted camp was erected, where troops could be practised in combined training with a depot to furnish them with field stores.¹

Another change was that clothing and necessities, which had embraced everything furnished regimentally, ceased to mean more than the terms now imply. In 1859 saddlery was transferred to the category of equipment which already included harness, an extra Inspector being added to deal with this class of goods; and when, in 1872, a new valise equipment appeared, accoutrements also became articles of equipment.

Thus in one way and another many steps were taken to increase the efficiency of the department, train its officers to carry out their more technical duties and assist them by publishing scales, regulations, vocabularies and descriptions of new equipments.

Also at this time the Military Store Officer undertook two specific duties which had never fallen to the lot of the Storekeeper of the past.

The latter had been responsible for his own stocks and those of the R.A. and R.E., but nothing more. Regiments were untroubled by equipment accounts. There was little for them to account for to the Government, beyond small arms supplied under Indentures by the Board of Ordnance.

But when the War Office undertook to equip the army, it had to keep watch and ward over what each regiment possessed, besides what was in its depots; and this duty

¹ The original depot is immediately to the left inside the present main entrance. The gateway into it is flanked by what were then Officers' quarters, the storehouses occupying the remaining sides of a square.

was at first assigned to the Military Store Officer who had to open an account with every unit he equipped and deal with any discrepancies brought to light. Under the Control system this duty lapsed. Regimental equipment ledgers were introduced, audited by the Controller at Woolwich. Next, when Control was abolished, the audit of store accounts remained a function of the Surveyor General; and when he ceased to exist in 1887 the duty devolved on the Financial Secretary.

The last of the new duties imposed on the Military Store Department was to accompany troops in time of war. Hitherto storekeepers and their staff had not been expected to go on active service. They remained at their peace stations and rarely moved. Staff for the field train which provided for the gunners and sappers had always been improvised when war broke out. In 1857 a memorandum was drawn up to define the respective responsibilities of the Secretary of State and Commander-in-Chief for equipping a force in the field. The former was to decide the strength in outline; the latter to say how it was to be composed in detail—what regiments, guns, siege train, horses, etc., and what camp equipment, entrenching tools or other stores, according to the nature of the operations. Should the Secretary of State approve these proposals, the Director of Stores was to see that the equipment required for immediate use was embarked with the troops. It was also his responsibility to ensure that reserves for upkeep were provided in abundance. A staff of Military Store Officers, clerks, artificers and labourers, was to accompany the force to whom all supplies would be sent, and whose stocks would be at the disposal of the army commander.

But these principles were not at once brought into systematic operation. In our small campaigns in China and New Zealand of 1860 the heads of various branches, artillery, engineers, commissariat, medical, etc., considered themselves entitled to draw stores without any authority from the headquarter staff. They even wrote home independently to the Director of Stores, the Secretary of State and the Horse Guards asking for what

they wanted, without enquiring what stocks were in the hands of the Store Department.

The reorganization that followed the wreckage of the old Board of Ordnance threw everything into the melting-pot, and it took some time to convert chaos into order. It was only in 1862 that definite arrangements for the supply of stores to an army in the field were drawn up, in far greater detail than those prepared by Wellington in 1827.

The head of the Military Store Department was to be at army headquarters and provision was made for the attachment of subordinate officers to flying columns. The Department was to deal with everything in the way of supplies which the army required except food, forage, fuel, light, medicines and medical comforts. One of its most important duties was to establish reserves and settle their location under instructions from the headquarter staff. The main reserve was at the Grand Depot and the advanced base, within two marches of the troops, was called the Field Arsenal.

The Chief Store Officer received his orders through the A.G. for arms, ammunition, accoutrements, clothing and horse appointments, etc., that is for everything necessary for the efficiency of the combatant man or horse. What was needed for non-effective services, camp equipment, barrack and hospital stores, vehicles, harness and general purpose equipment was dealt with by the Q.M.G.

Indents were to be approved by one of these two staff officers either individually or by means of a general order to the troops, and were to be limited to immediate needs so that the army should not be hampered in its movements. The Chief Store Officer was to be kept informed of likely requirements so as to enable him to provide in advance. Everything sent from home was to be consigned to him, and the navy was to report to him the arrival of all store ships. The Commissariat was to purchase no stores except at his request and to his pattern.

Besides the 60 rounds carried by the soldier, 80 rounds were to be held in artillery wagons for immediate

replenishment, 50 in the Field Arsenal and 810 at the Grand Depot—a total of 1000 rounds per rifle. Gun ammunition was distributed between the same echelons. Proportions of technical and general stores to accompany an Army Corps of two divisions (15,000 men of whom 10,000 were infantry) were drawn up in very considerable detail, also the stocks to be maintained at the Grand Depot and Field Arsenal. Packages were to be marked to aid in identifying their contents; a black horse-shoe for harness and saddlery, a black heart for clothing, a red ball for small arms and accoutrements, two red diamonds for ammunition and two black crosses for hospital and barrack stores.

At the conclusion of the campaign everything specially issued owing to active service conditions was to be returned to the Store Department either for local disposal or despatch to England.

All these details were very carefully thought out and bear the clear impression of a determination to avoid another disaster like that of the Crimea.

At the same time war equipment accounts were introduced. Hitherto regimental responsibility for equipment on service had been very loose. Now each unit had to open an account, debit it in the first instance with what accompanied it overseas, and enter all subsequent transactions. All losses before the enemy or by other unavoidable cause were to be supported by authorities and the account was to be transmitted quarterly to the Store Officer for audit. The latter in turn submitted the account to the A.G. or Q.M.G. with his remarks, and the Army Commander was to decide whether charges were to be made against the troops for anything missing.

These various matters indicate the strides made in some ten years. The old Ordnance Storekeeper, who started life as a junior clerk at the Tower, copying or registering documents, was little more than an accountant. There was a morphological change, a metamorphosis, and he emerged a commissioned officer with higher ideals and wider conceptions of his duties. It would be a

gross exaggeration to pretend he was a trained administrative officer in the modern sense, but he was fairly launched on the high road. There was still much to be learnt. Business methods were very primitive, military ideas needed to be imbibed, far closer contact with the army established. But if such progress could be made in so few years there is no reason why improvement should not have continued. What was needed was more decentralization, and more power as the Military Store Officer became better able to shoulder his new responsibilities.

Then in 1870 came Control, and progress was checked. The Ordnance barque lost its captain directly responsible to the Secretary of State for it and it alone. It was swept into the turgid stream of Control, fed by many tributaries. The committee on whose advice the Control system was adopted was a one man affair, and that man belonged to the Commissariat. It was the deliberate intention that this Department should absorb all the others with which it amalgamated. It did in fact swallow up the smaller fry, Barrackmasters, Purveyors and Military Train, but the Ordnance proved too big a mouthful.

In reality the supply and transport branch of the Control Department mingled with the Ordnance branch no more than oil does with water. The officers of the latter looked on themselves as a cut above those of the former. They had hitherto received a higher rate of pay and other advantages. The new scales were intermediate, levelling the pay of the two branches. Naturally this created jealousy and friction. The Commissariat was far the larger department and obtained almost all the higher posts, which was perhaps inevitable in view of the financial duties of Controllers. The Ordnance branch was given a few prizes and then all flow of promotion to the higher administrative positions ceased. The Commissariat was well nourished. The smaller and weaker Ordnance, about which Controllers cared little and knew less, went to the wall. It was starved, under-officered and undermanned. And all this time, it must be remembered, the army was consuming equipment at a rate that

increased in compound ratio, while its belly remained a constant.

Even more unfortunate for the Ordnance was the fact that its Director of Stores was replaced by a Director of Artillery with enlarged duties. Admiral Caffin, its chief at the time, had been most solicitous to promote its welfare. He fought hard to preserve its independent status but to no purpose.

The new post was invariably given to a gunner officer, an expert in artillery matériel. Until Sir Henry Brackenbury held the position in 1899 no single Director of Artillery had any real experience of army supply organization or really interested himself in this branch of the work. The provision of armaments and technical matters were his preoccupation. When framing his estimates and pleading for as large a share as possible of whatever money was to be had for the army it is easy to see how the scales would turn. It would be new guns that would win the day, not storehouses to hold them and staff to look after them. One cannot imagine him scanning a young Ordnance officer's note and remarks book to see how he was progressing.

The officers of the Ordnance, drawn from the common pool of the Control, received the same training as those who joined the Commissariat and Transport. They were no longer expected to be experts and ceased to undergo instruction at Woolwich. Since 1783, when the artillery took over from the Surveyor General of Ordnance the proof of its own guns and powder, a few artillery officers had been posted to foreign stations to conduct such duties with the old title of Firemaster. In 1870 these appointments were extended and confirmed under the title of Inspectors of Warlike Stores. The Inspectors underwent a course of instruction at the Artillery College, Woolwich, and were given a high rate of pay, and it was their duty to examine and test all technical stores in charge of the Ordnance besides those of the gunners.

When in 1876 Control was abandoned, split in twain largely by its own disruptive force, matters were not very greatly mended. The Senior Ordnance Store Officer of

the district (S.O.S.O.), like the Senior Commissariat Officer, was directed to carry out his duties under the orders of his general to whom he was to have access, though he might receive instructions through a staff officer. But generals had no responsibility for the Store Department and no staff officer with any knowledge of the intricacies of a work in which they had little interest. Few of them cared to be troubled with the unfortunate Ordnance officer's difficulties. That the Department suffered from disability and neglect, that it was understaffed, that its officers had legitimate cause of complaint, was admitted. These grievances were ventilated in Parliament and the press on occasions, but nothing was done.

The next step occurred in 1881, when the Commander-in-Chief became responsible for the discipline of the Ordnance Store Corps. Up to now the officers had been recruited almost solely by civilians after passing a Civil Service examination. Henceforth commissions in the Ordnance were given to officers transferred from some combatant branch of the army, and this certainly tended to create a closer relationship between the department and the troops it served. But the conditions did not, as a rule, attract the best class of officer. A rather indefinite stigma at that time attached to those in any army department. The army has, unfortunately, never been free from snobbery, a characteristic fostered by its officers and their womenkind being so thrown together in mess and social life. Moreover prospects were marred by the Director of Artillery continuing to use the Department as a happy hunting-ground for senior artillery officers in want of a job. Such men, distinguished though they might be as artillerymen, were necessarily ignorant of departmental work for which they had to rely on the very subordinates whose promotion they blocked.

A more important advance was that of 1887 which made the Commander-in-Chief fully responsible for all his supply services. At that time Sir Redvers Buller was Quartermaster General, one of the group of able soldiers

whom Lord Wolseley had gathered round him and who followed his fortunes. The whole business of Commissariat and Transport was in his hands. He fathered that branch, saw to it that its officers got their share of the new administrative staff appointments and built up a very efficient organization.

The Ordnance was less fortunate. In peace the Quartermaster General's branch of the staff had very little concern with its doings. Its officers were not eligible for the new staff appointments. The Director of Artillery was only represented in commands by a departmental officer. The staff of the army was not responsible for stores and munitions as it was for food and transport. There was less harmony between staff and department. The Ordnance officer continued to lean on his departmental chief at Woolwich rather than on his general. Over-centralization in details, that bane of the past, continued.

It must be remembered that the Ordnance was still to a considerable extent a naval department, though military work was by now its main preoccupation. After the Crimea, when its duties expanded so greatly for the army, they remained in the old narrow grooves for the navy. In fact, they even decreased when elaborate gun-mountings began to be used in battleships. These were in the hands of the naval engineering branch, so that the Ordnance dealt in little beyond guns and ammunition with their adjuncts.

The setting up of a Naval Ordnance Department, initiated at this time, was undertaken very gradually. To separate the personnel, premises and stocks at Ordnance depots was a very intricate business. Except at inland stations and a few that catered only for the navy, the work was everywhere blended. Stocks were intermingled; offices, storehouses, wharfs and cranes in joint use. Down to the office boy there was probably no one individual who could be said to serve the army or navy alone. The division took place in 1891 at Woolwich and the principal home ports where ships fitted out and naval reserves were held, viz. Portsmouth, Chatham,

Plymouth and their respective magazine stations—Priddy's Hard and Marchwood, Upnor, Bull Point. From the year 1895 the process was extended. But even in 1914 the Army Ordnance held naval stocks at Colombo, Singapore and Jamaica, though only as a convenience and quite distinct from those for land service.

This supplies another clue why the status of the Ordnance Store Officer should have remained vague and indefinite. His position in fact depended largely on the extent of his naval work, his own individuality and the character and fibre of his general and "B" staff officer.

At Aldershot, for instance, where efficiency was highest and he worked entirely for the army, his office remained at the Field Store depot until 1890. In that year an officer of very exceptional ability, Colonel Steevens, was posted to the district. His office was then transferred to military headquarters. He took orders direct from his general on all important questions, or on minor ones consulted the "B" staff officer, a Staff College man.

As officers of outstanding personality such as this moved from place to place they established the position of the S.O.S.O. on a higher plane. He became a real administrative officer, an important link in the chain. He would view questions from a wider standpoint and be better able to distinguish between what was important from the point of view of efficiency and what should rightly be refused as an unnecessary extravagance. Then, too, being in closer touch with the army, he would realize that there are ways of doing business which are bound to be resented. The soft answer that turneth away wrath would replace the curt refusal. John Steevens in particular was one who had the wit "from such a sharp and waspish word as No to pluck the sting."

But unfortunately officers of this calibre were all too few. More often, it is to be feared, they were dull plodders with offices at their depot, content to do the daily round, guided by nothing except departmental rules, happy if they could escape criticism on the one hand from their departmental head at Woolwich and on the other from a staff officer whose whole training and

experience might lie in commissariat and transport work.¹

The Department in fact was in a deep rut. It was unable to extricate itself by its own efforts, and received no help from those placed in authority over it.

Matters were so greatly focused at Woolwich that initiative was discouraged. The very antiquity of the Board of Ordnance, whose traditions were inherited, was largely responsible for this attitude. Its whole system had been founded on a policy of mistrust, a wise precaution in bygone times when public morality was at a low ebb. But the fog of suspicion thus engendered took long to disperse and had even been intensified by the abolition of the Respective Officers. Where so little was left to the discretion of the officer on the spot, it was natural that few should be prepared to go one inch beyond the strict letter of the law. The Senior Ordnance Store Officer, who had to check and approve all demands from the troops, was required to send a copy of every single indent to Woolwich for scrutiny, to ensure that he had not exceeded his authority.

The distinction between administrative and executive work had been accentuated under Control, and the S.O.S.O. could disclaim responsibility for the actual work of depots in his district, which were regarded as institutions apart. Every year a Garrison Board of Survey assembled to examine the stock and make sure the Ordnance Store Officer (O.S.O.) in executive charge maintained proper custody. For this purpose the Board was very much of a formality. But it was a grand opportunity for the Ordnance officer. He could then cloak with a mantle of authority transactions which he himself was not empowered to approve. With the signatures of various regimental officers, wholly ignorant of his work,

¹ The senior officers had never served in a regiment. They had direct commissions under the Control Department, and little opportunity of learning the higher flights of administrative work. They started life by making out vouchers, bills and lading, and keeping the books and records that constituted the elaborate official routine in connection with the issue and receipt of stores. The more credit to those who distinguished themselves despite these obstacles.

he could write down the condition of articles that had deteriorated from storage or use, convert unserviceable stock into old iron or wood, or perhaps cover up petty irregularities. But without the approval of this Board he could not condemn so much as a file worn out in his workshops. This ancient institution, the Board of Survey, we still have with us, long though it has been an anachronism.

Every five years, or when the Ordnance officer was relieved, a similar Board took a "survey and remain," a complete stocktaking, to fix responsibility for deficiencies. This was an immense job that might occupy months. All other work had to cease while it was in progress. It was thus very difficult to relieve officers at short notice, a serious inconvenience in time of war. The Ordnance officer received no scientific training and had but a very hazy knowledge of how the technical stores he dealt with were used. His workshops were in charge of a civilian Master Artificer without practical experience of army work. His munitions were examined and kept in order for him by an Inspector of Warlike Stores, who, though a gunner, had his office and laboratory, and spent most of his time at, the magazine depot.

The annual demand was intended to meet every need of the district for the coming year, and was based on estimates from the artillery, engineers and others. It included what was wanted for new major services. This being so, the figures of average annual expenditure, which entered into the calculations so far as concerned maintenance, were unduly swollen. What was demanded for new installations might be supplied even though they were not proceeded with owing to lack of funds. Large surpluses would then result. But even so many new services would arise owing to changes in pattern or scale for which this demand did not provide. For these the Ordnance officer was not allowed to make a supplementary consolidated demand to cover his further needs for the year. At home every indent for which the annual demand did not suffice was sent on to Woolwich to be met in detail; while abroad an intermediate demand was pre-

pared to which the indent, which gave particulars of the service, was attached.

These were all century-old customs, and the same can be said of everything else. The volume of work increased by leaps and bounds. Neither staff nor accommodation kept pace. Storehouses were unsuitable in design and insufficient in size, so were the ill-equipped workshops.¹ Owing to chronic shortage of personnel, transactions were always in arrears, aggravated by antiquated business methods.

There was no systematic classification of stores into sections such as exists nowadays. The vocabulary had been framed as a guide to nomenclature and price. The contents were divided into categories, but only to facilitate reference in a catalogue without index; not with the idea of separating stores into groups appropriate for a subordinate's charge.² The vocabulary bore no precise reference to the manner in which the stock at any depot might be arranged. This point is important. It supplies a clue to the time it took to execute orders. An indent might range over the whole vocabulary from the first page to the last and had to be passed to each subordinate in turn to extract what concerned him.

¹ The rule was that the Engineers provided all fixtures, including machine tools. But the R.E. had its own workshops, so the Ordnance always came off second best.

² For example the 1871 edition is divided into the following six sections :

- I. Accoutrements and small arms.
- II. Camp equipment, intrenching tools, harness and saddlery, drawing and musical instruments.
- III. Artificer's, earth boring and miner's tools. Metals, chemicals, paints, ironmongery, cordage, etc.
- IV. Miscellaneous stores. A very heterogeneous collection containing everything that did not seem to fit in elsewhere.
- V. Ordnance stores and tools for repair, pontoon equipment, carts and wagons. (Ammunition of every species and all artillery equipments were in this section.)
- VI. Barrack, hospital and military prison stores.

The sole change was that in 1886 carts and wagons were shifted into Section II and the sections split up into sub-divisions. But this was only still further to assist reference in a work that was expanding from a slim pocket book into a very bulky volume.

By the letter of the regulation every transaction was to be entered in the journal and posted in the ledger on the day it occurred. But with all this extracting and copying, this want of systematic grouping and with constant pressure of work, it is not surprising that such a feat was seldom accomplished. Records were neither up to date nor reliable and a current day-to-day stocktaking would have been impossible.

And what of Woolwich, the hub of all this work, whose spokes radiated to every corner of the Empire? Woolwich whose chief had the ear of the War Office and which altogether occupied a favoured position? There at any rate one might have expected more up-to-date arrangements. Businesslike methods at the root should have provided a general stimulus and spread to the branches. Gordon, the first Military Storekeeper at the Crimea, who became head of the Department at Woolwich not long after, was a very capable and zealous officer.¹ But his successors can lay claim to neither his ability nor his energy. Moreover they were hampered by rules and restrictions, given little more power than those at outstations and had to refer every petty question, not strictly governed by regulations, to the Director of Artillery. Woolwich, where the young officer was so often sent to learn his work, instead of being a school of efficiency, was the fountain-head of inefficiency.

Its storehouses became overloaded and chaotic. Bays and shelves were so constructed that it was impossible to look after the condition of their contents. Instead of articles being bundled or stacked in decimal units they were left in loose heaps scattered about different buildings. There was no systematic arrangement. Stocktaking was only attempted once, about 1885. The operation took eight to ten officials twelve months to conduct. It cost £4000 and resulted in the discovery of £87,000

¹ "A man of great ability and untiring energy, he probably did five times as much in a day as any one member of his staff. He once informed the writer that he posted his store ledgers with his own hands when cleaning up the stores after the Crimean War." Article on Woolwich in 1872 by the late Colonel Markwick, R.A.O.C., published in the *Corps Gazette*, September, 1907.

worth of surplus stores after deducting the value of deficiencies. The amount of obsolete stuff found was gigantic, and as a result some attempt was then made to ensure that such articles were in future brought to light. Each storeholder or foreman kept his own ledgers and tallies, both in his office. In the gun section the ledgers were found to be unposted for four months, the tallies unbalanced for two years. In 1888 a test was made of 295 items, and in 218 the tallies and ledgers disagreed; 286 gun carriages of old type had disappeared. In the tools section 1205 discrepancies were brought to notice out of 2100 transactions. Where errors were incapable of explanation, adjustments were effected by means of falsified vouchers. From home stations camp equipment, harness, wagons, accoutrements, etc., all poured into Woolwich. The staff disclaimed all technical responsibility. Everything had to be conditioned by the inspection branches and goods might lie waiting to be examined for years.

Owing to lack of space stocks were distributed among other depots to be held on deposit for Woolwich. But congestion was universal with the result that stores due on the annual demands could only be issued in dribbles. This, however, was little odds; Woolwich waited for hasteners before it bestirred itself. The number of individual indents from home stations and of intermediate demands from abroad with which it had to cope was of course enormous. When these involved orders on the Ordnance Factories each was dealt with separately. It took five such orders to provide six tail-boards for wagons, nine to obtain nine winch handles.

The Woolwich depot, on account of its size, was particularly affected by the lack of a proper classification of stores. There were 32 subordinates, each of whom was allowed two days to extract his portion of an indent. In the case of the annual demand it would take two to three months before the document reached the last concerned. What with journals, packing books and reports, the separate preparation of issue and receipt vouchers, and the posting of ledgers and tallies, each

transaction involved eleven manuscript entries ; and there were by now hundreds of thousands of such transactions in the course of the year.

Several War Office committees enquired into the state of affairs at Woolwich and all bore the same testimony. Accounts and records were unreliable and in confusion. They gave no true indication as to the situation. Methods were most dilatory. Subordinates had no definite responsibility. The staff was overburdened. It was said that Woolwich would be quite unable to bear the stress of a campaign on a large scale. Indeed it is fortunate that all our campaigns of this time were small and conducted against semi- or un-civilized races. So long did it take the Ordnance to recover that it was only just set on its feet when the South African War broke out. Had this recovery been postponed any longer disaster would inevitably have overtaken the Woolwich depot when subjected to what was then regarded as an unprecedented strain.

The history of the Ordnance Department since the Crimea, when the scope of its work began to increase by such leaps and bounds, falls into three distant epochs. The first, which lasted until 1870, was one of material and steady progress. The next was one of stagnation. New measures were conspicuously absent. No attempt was made to improve out-of-date methods or to decentralize. With the immense expansion of business delay piled on error and error on delay, like Pelion on Ossa. Matters at last became past endurance, and the third epoch, that of regeneration, was ushered in during the year 1893.

A new edition of the vocabulary was then built up, section by section, the basis of which for the first time was the charge of each storeholder or foreman at Woolwich. The arrangement, being based on what already existed, lacked method. Some sections were large, others small. Guns were in one section, their carriages in another. But still it was infinitely better than having no system at all.

At the same time ledgers and other records were

revised and made to conform to the new sectional arrangement of the vocabulary. Books were printed in tabular form, one for each section, which served as records of assets and liabilities. The same course was adopted for the annual demand. The forms on which intermediate demands, indents and other documents were inscribed were all revised and made more appropriate. One form was introduced which served either as a report from the storeholder of what was ready for issue, as an issue voucher or a receipt voucher. By means of a copying press six copies could be obtained, each of which must automatically agree.¹ Copying in manuscript, a fruitful source of error, was eliminated.

For demands and indents, a separate sheet was used for each section so that one complete copy could be kept in the office and the other distributed, sheet by sheet, to the subordinates concerned. The various processes to be gone through before an order was met could take place simultaneously. Each storeholder could set to work at once. The ledgers were removed from the storehouses and concentrated in a central office, the tallies were hung on the bays holding the items to which they referred and the journals relegated to the scrap heap.²

With the adoption of these simple contrivances the

¹ A further improvement occurred in 1899 when carbon sheets, which came into use with typewriting machines, replaced copying ink and press. The carbon process was simpler, speedier, clearer and cleaner.

Another innovation, of the year 1910, was the loose-leaf ledger, an immense advantage. The bound ledger had several columns on each page, the headings of which were printed to show every article in the section. Except at Woolwich half the columns might be blank, and of those containing entries some would be soon filled up while others remained comparatively empty. By having one removable sheet for each item, ledgers could be bound together to suit the needs of each individual depot. But the prejudice against the loose-leaf system was so great that two or three years passed before it was generally adopted. It was feared that fraudulent entries would be facilitated.

² At Woolwich a Journal somehow survived to record all orders from India and the Colonies, and to mark up the progress of their completion, until the year 1903. I happened to be instrumental in its abolition, having no idea that I was assisting at the obsequies of the earliest book of account of the Master of Ordnance of mediæval days.

constant inaccuracies and delays of the past speedily vanished and clerical work, especially at Woolwich, was vastly reduced. The storeholder was no longer tied to his office dissecting his ledger and trying in vain to make it agree with his stock and tally. It was possible to gain an accurate picture of the state of any item at short notice. He was able to get about his storehouses and concentrate his attention on meeting orders promptly or providing for them if his stock was insufficient.

Other innovations soon followed. The annual demand was made to provide solely for normal upkeep. It was followed up, month by month, by further demands should anything additional be needed, and outstations were no longer required to send a copy of every indent to Woolwich. Provision in fact was at last placed on a really scientific basis.

Ledgers being posted promptly, that cumbersome contrivance, the periodical taking of a survey and remain of the whole stock, was replaced by a current day-to-day stocktaking. When an officer was posted to the executive charge of a depot, he was only required to satisfy himself generally as to the accuracy of the stock. Thus it became possible to relieve officers at short notice.

Until now the Ordnance officer, heir to the old Storekeeper, was still in theory accountable in his purse and person for everything in his depot. The term storeholder, applied to a subordinate in charge of a group of stores, crept in soon after that of Storekeeper died out.¹ But the storeholder, or foreman as he was called if his charge was less important, had no strictly defined duty. Now the Ordnance officer became responsible for the work of his depot in general, while the storeholder or foreman was accountable for the particular sections of stores entrusted to his care.

At the same time the yearly Board of Survey by officers of the army was abolished. A Board was only assembled at the instance of the Ordnance when such a course was needed.

¹ The term storeholder is used in a Royal Warrant of 1865 which grants extra pay to senior non-commissioned officers of the Corps when acting in that capacity.

These measures connote a new spirit of confidence in the integrity of officials. In fact, they represent the final dispersal of the mist of suspicion through which for centuries the Board of Ordnance had viewed its servants. The atmosphere was at last cleared. Officers and their subordinates were allotted clean-cut responsibilities. And this leads to the subject of men without whom measures, however sound, cannot prove effective. The reorganization of the machine was set on foot by a War Office committee of 1893. That of the personnel to tend it by one that assembled in the following year.

At that time Colonel Steevens (afterwards Major General Sir John Steevens, K.C.B., K.C.M.G., first Colonel Commandant of the Royal Army Ordnance Corps) was at the War Office representing the Ordnance Store Department and Corps as staff officer to the Director of Artillery, and was a member of this committee. His knowledge of departmental work was unrivalled. He was an exceptionally gifted administrator, and the report of the committee bears the impression of his outstanding personality and wide views.

It must be premised that it had come to be realized that the Department was not in a healthy state. It held nothing to attract the keen or earnest soldier. Officers might transfer to the Ordnance because they had married on scanty means, for they were saved many expenses incidental to regimental life. But often, it is to be feared, those who joined the Department had failed to make good in their regiments. It was also at last recognized that the Department was under-officered. Further there was a new factor—naval work was fast disappearing and would soon vanish.

The committee started with the assumption that no mere patchwork would suffice, and proceeded to review and focus every branch concerned with the maintenance of the equipment of the army. There was firstly the Ordnance Store Department, charged with custody and supply but with no technical duties. Joined with this was the inspection staff at Woolwich Dockyard which examined goods of a general character. Next came the

Warlike Stores Inspection branch with its headquarters at the Arsenal and its officers at all important artillery stations. Then there was the Inspection branch for small arms at Enfield which administered and trained the Corps of Armourers. But besides these a small branch had come into existence engaged on work of an allied character. When eighty-one and a hundred-ton guns, worked by steam power, were mounted in fortresses the question arose whether the Artillery or Engineers should be responsible for the mechanism, and the War Office decided the duty should rest with the former. For this purpose three mechanical engineers were given special gunner commissions in 1885, with the title of Inspector of Ordnance Machinery, having under them certain Ordnance artificers and gunner artisans. By this time, with the more extended use of elaborate gun mountings, this specialist branch had substantially expanded.

Here then were five branches all intimately concerned in maintaining the equipment of the army, and the committee arrived at the conclusion that the correct solution of the problem was to combine them all into one, which it proposed to call the Army Ordnance Department and Corps.

Stress was laid on the fact that the officers of this new department must be trained and have a practical knowledge of the matériel they dealt with *and its uses*, and that they must be in the closest possible touch with the army in general. The Ordnance officer of the future should be not merely a provider, custodian and issuer; he must be qualified to examine his munitions and other stores and those of the army. The Inspector of Warlike Stores on the other hand, except at headquarters, must be liable to take his share of the routine work of the depot. The Inspector of Ordnance Machinery again must not confine his attention to the care of armaments. He must take charge of the depot workshop as well, a work hitherto entrusted to a civilian.

The Inspectors of Warlike Stores had to qualify by passing a course at the Artillery College, a preserve for gunner officers. The college was now to be thrown open

to the whole army. All administrative officers of the new department were to undergo this training, which was to include a short instruction in store and accountancy work.

The committee also recommended that the status of the Chief Ordnance Officer of a District be more clearly defined (the terms C.O.O. and O.O. replaced S.O.S.O. and O.S.O.). The responsibility of the general should be less nominal, he should take under his wing everything that concerned the efficiency of the department in his command. On the other hand the C.O.O. should not be regarded as a mere executant controlled in details of his work by the staff. He should have his office at district headquarters with free access to his general whenever he desired, and must at the same time be responsible for the whole work of his department. The Ordnance depot was no longer to be regarded as a matter with which he had little concern. Also the power of the Principal Ordnance Officer at Woolwich must be enlarged so that he did not constantly have to refer petty details to his Director.

So in brief reads the report of the committee. It brought the pay of the Ordnance officer in the junior grades on to a par with the much higher scale awarded to the Inspectors of Warlike Stores. It also increased the pay of officers promoted from the ranks and of the Inspectors of Ordnance Machinery. Yet, once it was admitted that in any case extra officers were necessary, it was cheap. This was due to concentration of duties. The I.O.M. looked after workshops besides doing his usual work. The store and inspecting officers were interchangeable.

The scheme, therefore, had everything to commend it. All services relating to the provision, inspection, supply and maintenance of the matériel of the army were unified. This was obviously in the interests of efficiency. And the reform could be put through without unnecessary expense. Thus it was simple to carry through. It was brought into force in July 1896. The old Ordnance Store Department and Corps were replaced by the Army Ordnance Department and Corps which included, not

only the former, but also the Inspection Staffs, the Inspectors of Ordnance Machinery, Armament Artificers and the Corps of Armourers. Aided by the improvements in the general methods of conducting business, a department mainly engaged on drudgery became a chief hand-maiden to the army. Instead of having to seek for officers in the by-ways and hedges, the high rate of pay in the junior grades attracted a class excellently qualified for its by now heavy responsibilities.

The sole criticism to which the scheme was open is that the training at the Artillery College was too technical and theoretical. To learn higher mathematics, metallurgy and chemistry was all very well for those officers who filled specialist jobs at Woolwich where they were concerned with questions of munitions design. But for those who joined for general Ordnance work, to whom inspection was an accessory function only, a more practical education would have been better. However no other means of training was then open and, speaking generally, the scheme worked admirably. But though the administrative officers under this system were taught at the Artillery College to inspect all types of munitions, in practice the examination of gun equipments passed into the hands of the Inspectors of Ordnance Machinery who were even better qualified educationally for what was a mechanical engineering service.

Soon afterwards Steevens was appointed Principal Ordnance Officer at Woolwich. No one could have been better qualified to watch over the youth of a department which was so largely the work of his own hands, guide it into proper paths, and force those at outstations to make a proper use of their responsibilities and exercise common sense and judgment, instead of always leaning on Woolwich as in the past. Annual demands had hitherto been prepared in a rather haphazard way. The plan by which they were to be supplemented by intermediate demands was a novelty. Many were the mordant criticisms from Steevens' pen that reached officers of the old school who would insist on asking for stores in sixpenny packets; many the caustic comments when, on the basis of three

years' average issue, provision was made to replace the whole outlay on some costly new service.

Meanwhile arrangements had been in progress to collect and store the extra equipment needed to place the army on a war footing.

At the Crimea, and indeed for some time after, anything specially wanted for service was shipped separately and accompanied the regiment overseas as baggage. Reserve depots existed at the Tower, Woolwich, Portsmouth, Devonport, Chatham, Dublin, Malta and Gibraltar holding camp equipment, entrenching tools, small-arms and ammunition, accoutrements, harness and saddlery. But this was in no sense what we now term mobilization equipment, the real need for which only arose when short service was introduced in 1870. There were then for the first time reservists to be armed and equipped, entailing extra transport to carry their rations and stores.

The first step was in 1875, when mobilization tables were drawn up to show where units would assemble and receive their reserves and fighting equipment, and for their classification into Army Corps, each ready to move to the point where its services might be required as an organized fighting body, complete within itself in all arms. The scheme was ambitious, it provided for eight Army Corps, but was only a paper plan. The materials to fulfil it were not forthcoming and no attempt was made to fill the gaps. "I have a remembrance," the late Colonel Markwick, R.A.O.C., wrote me apropos of this period, "of soldiers of an infantry battalion, quartered at Woolwich, coming down to the Arsenal with new or strange horses and fitting brand new harness on in the roads of the Arsenal. Never was there such a scene of bucking horses, new wagons, hard, stiff, polished harness of the heaviest character, all to be put together among puffing steam-engines and hideous noise of machinery." There was no organization as we know it now. It was merely laid down that what was required to complete units for mobilization was to be drawn at

certain places of concentration where reserve stores were held, and a list of anything else sent out for his use was to be given to the commanding officer on board ship.

In 1881 a new scheme of more modest dimensions was prepared. This extended to but one Army Corps which was to be ready at any time for the small campaigns in which we so often engaged.

But it was only in 1887, when the Commander-in-Chief became responsible for Ordnance services, that detailed plans began to be drawn up. Hitherto what might be wanted for mobilization was concentrated in bulk at a few large depots, the sites of which had not been selected on account of their proximity to the troops they would have to outfit. Woolwich was the principal centre. There the stores were collected in a confused mass. No organized plan for their issue existed, nor were any complete tables in existence before 1888 detailing the war equipment of any individual unit. Now what was required for Aldershot, which it was admitted in Parliament might have taken *six weeks* to get out of Woolwich, was stored either at Aldershot or Southampton, which replaced Portsmouth as a reserve store. During the next few years arrangements were made to build fresh store-houses, or to turn existing buildings into mobilization stores, at sixty-two different centres, so as to decentralize the reserves.

The gradual perfecting of the system is reflected in the mobilization regulations which soon after appeared. In 1892 mobilization equipment was classed in three categories. There was the personal outfit of the soldier—arms, accoutrements, etc., for reservists; the first regimental equipment of the unit—harness and saddlery, machine guns, entrenching tools and cooking appliances, with the wagons for their carriage; and the second regimental equipment—extra ammunition, ammunition carts, supply wagons, water carts and ambulance wagons. Every unit had printed lists of what it was to draw under each of these headings, with demands ready prepared to act automatically as vouchers.

The personal outfit and first regimental equipment

was by now stored at the place of mobilization, at or near the unit's peace station. Having drawn this and received its extra horses, it sent a detachment for the second regimental equipment, still concentrated in bulk, it might be a long way off. For instance, regiments in Ireland had to send all the way to West Croydon. The detachment then rejoined the regiment at its place of concentration.

By 1895 the whole of the equipment was held at the place of mobilization, except that the reservist was now equipped at his regimental depot. By 1898 there was still further decentralization. The equipment was now in most cases held by the regiment itself, which greatly simplified matters. The Ordnance kept the equipment of units that existed in peace only in the form of cadres, and the Chief Ordnance Officer carried out a periodical inspection of the whole and arranged for turnover. Articles which might not always be required formed an exception, for instance, tentage and blankets which were stored in bulk.

There was, therefore, by now a clear distinction between what was definitely earmarked as regimental equipment to be automatically taken into use on mobilization, and what existed as a general reserve. But the latter was still in no sense a real war reserve, calculated to replace wastage for a certain fixed force and period. It was merely a collection of a few important items likely to be wanted on emergency. It was moreover entirely at the mercy of the War Office, and a standing temptation to a War Minister anxious to prove his zeal for efficiency and mindfulness of economy. There was no assurance that it might not be depleted.¹

The lack of a regular war reserve proved very serious in the South African War. Half our rifle ammunition had an expanding bullet, the use of which was proscribed by the Hague Convention, to which both the Boers and

¹ In 1896 Mr. Brodrick complained that the late government had employed the reserve of field guns to create new batteries, so that for 242 in the hands of the artillery there remained but two to replace what might be damaged or worn out. Parliamentary debates on army estimates 1896-97.

ourselves subscribed. We were therefore restricted to the other half and, despite all efforts to collect this pattern wherever it was to be found, the available stock soon fell to eight weeks' consumption. Three million rounds a week were asked for by South Africa while the Ordnance Factories and trade together could only produce about two and a half million. For field guns the amount available in England was reduced to even less than eight weeks' needs. The navy and home defence had to be requisitioned for ammunition and even guns, and the dangerous expedient of postponing Admiralty orders was resorted to. A number of complete field artillery equipments with a complement of ammunition were also bought from a German armament firm. The expenditure of ammunition in fact was without precedent, although of course the figures pale into insignificance before those of the Great War.

The same may be said of every species of equipment. There was a shortage of machine guns, which had to be withdrawn from fortresses. The reserve of saddlery was 500 sets to meet the wear and tear of 16,000 ; demands from the Cape and Natal during the first few months of the war totalled 30,000 sets. The reserve of camp kettles was 2000, while one single telegram asked for 5000. Of hospital equipment there was no reserve at all. It was this general shortage that led to such criticisms on the Director of Contracts' efforts to purchase at very short notice.

To obviate such a dangerous state of affairs being possible again on the outbreak of war, ten and a half million sterling was voted by Parliament in April 1900, expenditure being spread over three years. This was employed in building up a war reserve not only of guns and ammunition, but also of engineering equipments, transport vehicles, harness and saddlery, accoutrements, camp and hospital equipment, and in fact every conceivable category of war requirement ; together with materials and tools for repair and the necessary store-houses to hold it. Each year the Army Council had to certify Parliament that the reserve was intact.

The war resulted in other changes, the reasons for which are discussed in the portion of Chapter XV dealing with that campaign, and which are only mentioned here for the sake of completeness.

It was found expedient to have a central office at the base whose duty should be to co-ordinate and provide for all Ordnance depots at the seat of war, and the central "Provision Office" became a part of Ordnance war organization.

The attempt to keep accounts on ordinary peace lines broke down and an order appeared that units before taking the field were to balance and close their equipment and clothing ledgers. The Ordnance alone was to keep store accounts on active service.

One other very important innovation resulted from the South African campaign. So long as no more speedy means of communication existed than the wagon or pack animal, the advanced depot of stores, or first replenishment, had perforce to be close up to the troops; the head of the Department was at general headquarters, and a representative with each detached formation.¹ But, with the use of railways, it became possible and preferable to keep such valuable property further to the rear. Unlike food, it was unnecessary to provide clothing and equipment from day to day, with the result that the need of Ordnance officers at the front failed to be realized, particularly as the staff was so little concerned with this branch of the service. The proper place for the Ordnance officer, it was held, was with his stores and no organization existed further forward for their supply. The South African campaign proved that an Ordnance representative was needed with each main body of troops. But it was only after a struggle, with great opposition on the part of some, that this principle was conceded.

¹ The following is an extract from a private letter from Sir John Steevens (then a young officer acting as O.O. of a division in the Zulu War of 1879).

"I am going to ride over to see the general to-morrow about something; it is great fun being 'boss' of my Department up here. I am my own master entirely and only take orders from the general himself."

By this time the last stage in the evolution of the Department had been reached by the creation of an Army Council. Duties at the War Office were split in twain, as was the vocabulary. The Warlike Stores Inspection branches at Woolwich, Enfield and Waltham were separated again from the Army Ordnance Department (with which they had never really amalgamated), and were administered by the Master General of Ordnance. The inspection of general stores and equipment at Woolwich on the other hand remained with the Ordnance, these being provided by the Director of Equipment and Ordnance Stores under the Quartermaster General.¹ But this division only affected headquarters. Elsewhere the Ordnance remained responsible for the inspection, as for the repair, of everything it dealt with. Moreover, although the navy had set up its own Ordnance Department, it had no officers trained in the examination of munitions. The task of inspecting and testing these, both on board ship and in naval magazines, remained a duty of the Army Ordnance.

Each command was given its Assistant Director of Ordnance Services to superintend the whole work of the smaller military districts which it absorbed. At the same time general officers, through their chief administrative staff officer, were given wider power in dealing with purchases, excess issues and deficiencies, and a civil War Office staff was posted to commands to act as auditors and financial advisers. Thus many minor matters, previously referred to the War Office, could be settled on the spot with the concurrence of the Financial Adviser. The current local audit of store accounts was a great boon. The petty queries on his ledger account that reached the unfortunate Ordnance officer from a civilian accountant at the War Office, maybe a couple of years after the event to which they referred, were very troublesome. An intricate transaction connected with the breaking down of some type of ammunition and its

¹ The title of Chief Inspector of General Stores was changed to Chief Inspector of Equipment and Stores so that his initials should not clash with those of the Chief of the Imperial General Staff.

conversion into another was in fact almost impossible to explain on paper to one ignorant of the subject. But a verbal explanation at the time was a simple matter.

Curiously enough the term indent again came into use, but not on account of its historical significance. The new field service regulations contained a chapter on the utilization of local resources in the theatre of war. Requisition was the term most appropriate for anything forcibly obtained in such a way. The word indent was still a colloquialism and was re-adopted to describe the ordinary method by which troops replenished their equipment. After the Crimea the Ordnance had taken over the Commissariat phraseology. Now the Army Service Corps employed that of the Ordnance.

It was in the first decade of this century that we began to feel the menace of the growing German navy, which seemed designed as a direct threat to the British Empire with its scattered units. It became ever clearer that our military plans must be based on the hazard of a continental war. For this the leisurely mobilization arrangements of our colonial campaigns of the last half century would not suffice. The home army was organized into an expeditionary force of six divisions with cavalry and artillery. Fixed establishments of Ordnance personnel to accompany the force were laid down; a Director and Deputy Director, one at general headquarters, the other at the headquarters of the lines of communication, each with a definite staff, a Deputy Assistant Director with each division, a staff including storemen, clerks and artificers for the base depot. But so little was the immense part that matériel would play in the wars of the future realized that the whole staff of the Deputy Assistant Director consisted of one clerk. Lines of communication between the overseas base and the front were organized on a more definite system, though no road transport was allotted for conveying Ordnance stores from railhead. The only items so provided for were foodstuffs, and ammunition carried by artillery echelons.

It was anticipated that divisions would refit at intervals of about fourteen days.

Another result of this changed outlook was greater concentration of our striking force at large centres at home, where it might be practised in combined training and have all in readiness for speedy embarkation. A number of small isolated barracks were abandoned and garrisons withdrawn from minor outposts of the Empire ; in place of which a large military colony came into being on Salisbury Plain, only outrivalled in point of numbers by Aldershot. At the same time the great self-governing Dominions began to provide for their own defence. Canada founded its Ordnance services at the beginning of the century, the Commonwealth of Australia followed suit, and next the Union of South Africa, Ordnance officers from the British army being lent to help in organizing the new establishments. These changes, combined with improved means of communication by rail, sea and telegraph, led to a very substantial decrease in the number of British Ordnance stations, so that there remained but eighteen depots of importance in the United Kingdom and nine abroad.¹

In 1911 there occurred the Agadir crisis, when for a month and more we hovered on the brink of war with Germany. The danger blew over, but thence onwards our mobilization scheme grew continuously more and more perfect. Supply columns and ammunition parks, equipped with mechanical transport, were formed to link up the railhead with regimental horse transport. The mobilization period was shortened. Railway and shipping time-tables were drawn up for embarking troops and war reserves.

The crisis also led to closer, though entirely non-committal, relations with the French War Office, and sites were decided on to serve as overseas bases in case of need. These were allotted different colours—the “blue base” and so forth. The war reserves were packed and the packages marked with the appropriate colour so as to be ready for immediate despatch.

¹ See Appendix VI, Vol. I.

Precautionary measures to come into force in time of danger were improved. A precautionary period was one when steps were taken to guard particularly vulnerable points, such as harbours, magazines, railway bridges and cable landings. Arrangements for the despatch of the necessary stores to these points from Ordnance depots were perfected in the greatest detail.

A final touch was actually given to the arrangements just before the outbreak of the Great War. Sets of loose-leaf ledgers were prepared for main base depots, and for such smaller ones as might be formed as the campaign developed. Each set was put up in a specially designed case, which contained also books of regulations, stocks of various forms required for use in the field, together with a supply of stationery of all kinds, ready for immediate use. It is interesting to recall that the preparation of these sets was completed at the latter end of July 1914, and that they were actually despatched with the first issue of the war reserves to the seat of war in the early days of August 1914.

It may be added that, when put to the test, the mobilization scheme was so well thought out that it worked without hitch.

CHAPTER XIII

THE ARMY CLOTHING DEPARTMENT

IMMEDIATELY on the outbreak of the Crimean War colonels began to wax fat on their clothing allowance, just as they did in the Napoleonic Wars. Normally their profit was calculated to average £750 a year, but now the figure rose to as much as £2000 in some instances. War was declared on the 27th March 1854, five days before the new clothing year started. The army was at once placed on a war footing, but the supply of recruits failed to keep pace with the demand. Throughout the campaign effectives were forty to fifty thousand under establishments, on the basis of which the colonel drew his allowance. Then came peace, declared on March 30th, 1856, and again the colonel profited by the reductions that ensued. This was, no doubt, not the fault of the colonel. It was the lottery of war in which he drew all the prizes and the private all the blanks.

Now was promptly accomplished what one Committee and Commission after another had failed to bring about during the Napoleonic Wars. In June 1854, with one stroke of the pen, the colonel's vested interest in clothing and equipping his regiment was abolished. He was to be granted instead an annual allowance, the figure in the line being £600. He was to continue to provide to the usual scale, but to be paid only the cost price of what he actually supplied. The Secretary-at-War was directed to draw up a detailed scheme giving effect to this order. But before he could do so the whole system was altered, and the colonel enjoyed his profit for a little longer.

The following year was that in which all civil work connected with the army was absorbed by the Secretary of State for War. On June 21st two Royal Warrants appeared. One abolished the Board of General Officers. The other ordered that the clothing, equipment and appointments of the army should be provided by the Secretary of State, subject to any prior engagements entered into by the colonel for the next year. A Director of Clothing was appointed, responsible to the Secretary of

State for everything hitherto found regimentally and placing his orders on the trade through the Director of Contracts, and a depot was created where everything was to be delivered, inspected and distributed.

The items embraced in the category of clothing were thus administered quite independently of those classed as Ordnance stores. There was but one central depot ; and while the Ordnance was so often in the throes of reorganization, clothing administration for long followed an undisturbed career. When appointments ceased to be classed as clothing, the items dealt with became comparatively few and simple. Once issued they were not returned. Repairs were such as the regiment could effect. Provision was fairly simple, for consumption was regular, the scales being annual. Thus there was no particular need for an intermediary between the unit and the central depot.

Also one individual was in charge of the business for a very long tenure of office. The first Director of Clothing, Sir Thomas Troubridge, became Deputy Adjutant General in 1857. It was this D.A.G. who was responsible to the Commander-in-Chief for all questions of pattern. At the same time the directorship of clothing was amalgamated with that of stores. Mr. Ramsay, however, who had been Sir Thomas' assistant, continued to look after the clothing part of the business. Next, in 1863, the two offices were again separated, and Mr. Ramsay held the appointment of Director of Clothing until 1893. He was thus in charge of the work for 38 years. There were many reasons therefore why the system should remain undisturbed.

But the staff was entirely civilian and incapable of expansion with a view to creating overseas depots in time of war. Hence the Ordnance had to deal with clothing at the seat of operations, where it took custody of, accounted for and issued what was sent from home. This was a weak point. The Ordnance officer had no training in peace for a duty that devolved upon him on service.

Nevertheless the department was faced with many

difficulties at the outset. Everything had to be created, whereas for munitions the War Office had only to expand the organization of the defunct Board of Ordnance. The site first selected for the depot was Weedon, where there were large unoccupied barracks connected with the rail and canal system of England. The premises of Hodgson and Hayter, regimental packers and shippers at Mark Lane in London (who were now thrown out of business), were also employed to some extent for the delivery and issue to regiments stationed abroad. Both Sir T. Troubridge and Mr. Ramsay objected to Weedon on the grounds that its distance from London would make supervision difficult, and in the event their objections proved to be justified. Mr. Elliott, a servant of the Board of Ordnance, with a reputation earned in Canada, was appointed Storekeeper. He was told to model his procedure on the rules and regulations of the Board, in so far as they were applicable, but beyond this seems to have been left very largely to his own devices.

The War Office undertook to clothe the army primarily owing to the scandals of the Crimea. The first and most important step therefore was to set up a system of inspection, and the whole history of the Weedon depot centres round this side of the work. The system was not so well planned as that instituted at the same time at the Tower. There was no Superintendent of Inspectors in charge of the whole duty and independent of the Weedon Storekeeper. There were six Inspectors, one of whom was graded as chief, but he was little more than *primus in trapes* among his confrères. The rate of pay was lower than at the Tower. In fact, it was preposterously inadequate. Then the Inspectors had no skilled assistants. The so-called viewers who made detailed examinations were merely labourers.

“The laudable object of the War Department doubtless was to add the recommendation of economy to those to which their new system might be otherwise entitled. With this view the establishment was stinted, and the Inspectors were miserably underpaid. Officers of intelligence, ability and practical experience received

salaries of only £100 a year, a sum quite insufficient for the decent support of themselves and of their families. Yet to them was entrusted the power to decide upon the acceptance or rejection of goods of very large value, which contractors naturally wished not to have returned upon their hands. The result was inevitable. These officers were thereby subjected not only to the suspicion that their services were considered of little value by their superiors, but to the graver imputation that persons so inadequately remunerated might be ready to show favour from corrupt motives to any contractor who could purchase their goodwill. We think there is no ground for such imputations."¹

Some of these officials understood their work. One, who dealt with cloth, invented what seems to have been the first machine devised for testing the tensile strength of fabrics. Such machines are now universally recognized in the trade and used in government and commercial testing houses. The specification for cloth laid down the test to be passed, with the result that every firm which supplied Weedon found it expedient to buy a machine from the inventor, a very undesirable relationship between Contractor and Inspector.

Others were in no sense qualified for their special functions. One was taken on by Mr. Elliott because he was a relation of his wife. Another had failed as a farmer. Troubridge was acquainted with his family and offered him a job at Weedon, but failing to pass the simple examination laid down for a clerical candidate, he was made an Inspector.

Contractors were unused to having their goods subjected to any technical test. The D.A.G. and D.Q.M.G. who viewed clothing for the Board of General Officers had always been content with a superficial examination. Many were the complaints lodged against the Weedon Inspectors. They were accused of bribery and favouritism, of rejecting goods on frivolous grounds, of subjecting them to unnecessary strains. Objections were raised

¹ Report of Commissioners on Stores and Clothing Depots at Weedon, the Tower and Woolwich, 1859.

to the fact that materials were treated with chemicals to see that the dye was fast, that cloth was weighed when dry to verify that it had not been loaded with water, or that the soles of boots were opened out to see what was inside them.

Moreover inspection was often rendered nugatory owing to the system which the War Office inherited from the Board of General Officers. Tenders were accepted to the contractor's own sample, which was then sealed in London. This was supposed to agree with the official standard pattern and the specification written on its label, but in reality might differ in very material particulars. Here for example is a report from the two boot Inspectors: "Sir, having examined the sealed pattern transmitted by Mr. Dowie for our guidance as to the supplies of 5000 pairs boots, under order Y.19,890, we feel that, before the inspection is proceeded with, we should be remiss of our duty if we did not bring under your notice the very unsatisfactory result which is likely to follow their issue. Irrespective of the inner sole (belly) being contrary to the terms of the specification, the principal part of the uppers are cut from the commonest description of East India kips; the workmanship in the sewing seam is as bad as it possibly can be, much worse than those received from the Tower, and the sole leather might perhaps, with care, serve for three weeks, or at most a month's wear. We are bound to admit, in justice to Mr. Dowie, that the bulk of his supply of 491 pairs in part of his order for 5000 is fully equal to the sealed pattern in point of material: but we humbly beg to request that we may not be held responsible for the durability of the boots if they are to be passed upon reference thereto.

"P.S. The piece of sole leather, which is also sealed, being cut from a very common foreign butt, and not by any means from the prime part, i.e. from that part nearest the shoulder, is rather adapted for indoor wear than the rough usage to which it would be subjected."

When the contractor called at the War Office to protest—"Did I seal this boot for you?" exclaimed

Troubridge. "I am told at Weedon that I have sealed you a very bad pair of boots, I do not think I could have been so stupid." He was however reassured by his pattern-keeper who thought the boots very good though lighter than the standard, whereupon Sir Thomas ordered them to be accepted. The boots from the Tower mentioned in this report were some 150,000 purchased by the Board of Ordnance during the course of the Crimean campaign which were rejected by the Weedon staff, and had to be sold at a heavy loss. Twenty-one thousand greatcoats, also rejected, were supplied to the militia.

In other cases the label on the standard pattern read that pure wool was to be employed, while the pattern sealed at the War Office for the contractor contained an admixture of shoddy or cotton. A common practice was to rub out the chalk marks placed on rejected goods to indicate defects, and resubmit them hoping for better luck next time.

It would seem, indeed, that even worse malpractices were possible. Apparently the official seal affixed to the contractor's sample could be fraudulently tampered with. On one occasion 9000 brushes were rejected as having less bristle than the sample, which somehow found its way back to the War Office. They were replaced by a fresh lot even worse, and with twenty-one fewer knots of bristle. At the same time the contractor arrived at Weedon with two fresh samples bearing the official seal, which corresponded with the second consignment in every particular. Thereupon these very defective brushes were passed on the spot. This unsavoury incident was never satisfactorily explained. It is significant that the brushes were accepted by the troops practically without comment.

But despite all shortcomings and difficulties the Inspectors did good work. Never before had any real attempt been made to test the quality of clothing materials or necessaries. Even those who were hostile to the new plan were forced to admit that the soldier benefited from the change and got better clothes and far

better boots. These, by little and little, had probably been getting worse during the long years of peace that preceded the Crimea. Manufacture was no longer in the hands of the small man employing at most a few journeymen or apprentices and taking a pride in good work. The army contractor's sole interest was his profit, and he was notorious for scamped work.

If cloth was found to contain shoddy or to be weighted with water one can only suppose the practice was no novelty. If it was discovered under chemical test that dyes were not fast, the cloth of the past presumably faded. If samples inferior to the standard were sealed, or if a seal could be fraudulently affixed to a defective sample, the same must have been possible when the work was in the hands of a Board of Generals. If worthless brushes were accepted by the troops without complaint it is because they had been in the habit of getting such articles in the past.

Another advantage of the new system, though one no doubt at first responsible for much of the trouble, was that the War Office came into touch with the manufacturer and saved the middle-man's profit. The small ring of contractors who had served the colonels protested vigorously against the new system of purchase by open tender and inspection by what they deemed unfair methods. They even managed to obtain a parliamentary enquiry, though it made no progress beyond taking a certain amount of evidence. They soon found their prices undercut and lost the business. Cloth was purchased direct from the maker and reissued on a separate contract to the tailor to be cut out and trimmed. The different parts and materials used in the construction of saddlery were bought separately and assembled at Weedon which employed a large staff of saddlers and saddle-tree makers. As the lowest offer was invariably accepted, the War Office found itself dealing with some rather shady customers. Rejections were at first very heavy though soon reduced to more manageable limits.

It was also claimed that the new system was cheaper, but this is incapable of proof. Not only was the coatee

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replaced by a tunic with more substance to it, but the private was given a cloth hitherto reserved for sergeants and drummers. The texture of his coatee had really been little better than baize. The following figures give an idea of the prices paid under the old and new systems.

	1850	1857
	s. d.	£ s. d.
Cap	3 8	2 10
Coatee or tunic	13 10	1 1 10
Trousers	8 5	8 2
Boots	7 3	9 0

Had the difficulties at Weedon been confined to inspection they would doubtless have been overcome with more experience. But the depot had a bad start in every way. It was starved and Mr. Elliott seems to have been a poor organizer.

To begin with, the original idea was to provide two years' stock to come and go on; but from motives of economy this was not done. The first year catered for was 1857. In some instances the clothing due on April 1st was only ordered in August and delivered in November, reaching regiments in India in May of the year following. Then the Mutiny followed close on the heels of the Crimea and there were unprecedented large drafts to be fitted out; 40,000 troops went to India in 1858-59. On top of this came a large influx of clothing from the Crimea, most of it unserviceable or of obsolete pattern.

It was perhaps the fact that there was no working margin of stock which caused Mr. Elliott to under-rate the value of proper storekeeping and accounts. The Inspectors were divided into four sections, cloth and uniforms, boots, saddlery, necessities and miscellaneous items. For each of these sections there was a foreman, but he had no independent responsibility. He merely assisted the Inspector and packed up for issue what was delivered as fast as it was examined and passed. There being no stock to account for, no ledgers were opened, nothing beyond a few rough documents where random

figures might be jotted down. The only official record of receipt and issue was in the journal where every item was jumbled up together. But the Director of Clothing framed his purchases on the basis of establishments which were in excess of actual strengths. So, little by little in the course of the next year or so, supply overtook demand and stocks began to accumulate.

Then the trouble began. With no ledgers, accounts got inextricably tangled. No attempt had been made to allot storage accommodation, provide racks and bays for each class of article, or to separate the inspection from the storekeeping branch and give the foremen definite charges. The Inspector's business on the other hand was to inspect, not to look after the stock. Every month that passed must have increased the confusion and made the accounts more hopeless to unravel. Finally Mr. Elliott himself cut the Gordian knot of his difficulties. He borrowed £500 from a Weedon contractor, left his wife and eloped back to Canada with an actress. Perhaps the War Office was indemnified for its losses to the extent of his guarantee bond of £2000.

This was the end of the Weedon depot. The objections owing to remoteness from London were proved to be well founded. But failure was aggravated by the fact that it was opened at a difficult time, was not given a fair start, and was understaffed and underpaid.

Pending the selection of a new site, deliveries were made to Mark Lane where the Inspectors were sent. They continued to superintend the whole business, Hodgson and Hayter merely providing accommodation and packers. Saddlery alone remained at Weedon till its Inspector went to Woolwich in 1870.

In 1859, a new depot was opened on the river at London, premises at Pimlico being taken up on lease and proper accommodation provided.¹ The Pimlico depot now lies open to the criticism that it has no railway

¹ The origin of Pimlico was a wharf employed for trading with America, and the name came with the trade, being the last living word in the language of the Algonquin Indians.

approach. But this mattered little at the time. For inland transit, goods were forwarded by canals which debouched into the Thames near London. Clothing destined for stations on the coast or overseas could be conveniently sent to Woolwich or the Tower for despatch with consignments from the Military Store Department whose depots served as post offices, receiving and issuing the bales and parcels from Pimlico to the units for whom they were intended. The cheap tailoring trade was situated in the east end of London. The depot was under the eye of its Director and the site had everything to commend it. Also it was able to profit by the mistakes of Weedon. By this time a good stock had accumulated. An adequate staff was created and suitable buildings erected. Ledgers, tallies and other records were instituted and a five-yearly stocktaking.

Clothing for the Horse and Foot Guards had not been entrusted to Weedon. The Gold Stick received an allowance out of which he continued to clothe the Household Cavalry. To provide for the Foot Guards a building had been hired at Westminster. But the materials were only cut out there and taken away by operatives to be made up in their own homes. When Pimlico was opened the Westminster establishment was closed down, and its staff transferred to the new depot. The Foot Guards fell into line with the rest of the army.

Nor did Weedon cater for the gunners and sappers, hitherto clothed by the Board of Ordnance. In these regiments it had been the practice to send out uniform for those abroad in a finished state; while for those at home it was delivered at Woolwich and Chatham basted, and there made up by regimental tailors. With the disappearance of the Board of Ordnance an entirely new plan was adopted. In 1856 a large tailor's shop was started at Woolwich Arsenal to prepare clothing for both regiments, some 30,000 strong. Two hundred operatives were employed and sewing machines installed worked by power. The cloth was got from Weedon, it was cut out and made up under the supervision of military tailors drawn from the R.A. and R.E., and when finished was

inspected by a board of field officers. Other items were obtained by contract.

This novel experiment of the army making its own uniforms proved so successful that the idea was borrowed by Pimlico, where a much larger factory with accommodation for 1200 women was completed by 1863. The plan had several advantages. Contractors' charges could be checked with those of the factory. In the cheap tailoring trade, the most sweated and underpaid of industries, there were several middle-men's profits before the unfortunate seamstress got any wage; these were saved in the factory. Work was less likely to be scamped, and the danger of garments becoming infected with disease in the worker's home avoided. The factory also trained regimental master-tailors. Nevertheless Pimlico continued to rely to some extent on outside assistance to allow of expansion in time of war.

In 1870 the Woolwich establishment was transferred to Pimlico. Only the Household Cavalry, the state trumpeters and kettle-drummers with their gorgeous scarlet and gold robes, now remained outside its scope, and uniform for these was taken over in 1880. From that year onwards the department clothed the whole army.

Moreover the work of Pimlico was not confined solely to the soldier. The Board of Ordnance had provided for other bodies besides the R.A. and R.E., and in 1862 this extraneous work was transferred from the Tower to the Army Clothing Department. The Marines and a number of semi-military and civil authorities were catered for such as the Duke of York's School, the Chelsea pensioner, convict stations and lunatic asylums, the Post Office, Custom House officials, Office of Works and Constabularies, the Royal Forester of Windsor and the Beef-eater at the Tower. The articles even included bonnets and nightcaps for female convicts.

Perhaps the miserably paid Inspectors at Weedon were not so entirely above suspicion as was reported. At any rate the inspection staff was reconstituted and two colonels were placed in charge of the work.

The Adjutant General remained responsible for

patterns, Her Majesty's pleasure being always ascertained should any substantial alteration in uniform be contemplated. But the patterns themselves and the official seal were transferred to the custody of the military Inspectors. Twice a month an officer from the A.G.'s staff attended at Pimlico and affixed his signature to any new patterns after witnessing their sealing.¹ Moreover now the contractor had to tender to the sealed pattern instead of to a sample of his own, and in 1864 it was ordered that all new patterns and specifications were to be prepared by the Inspectors. All these measures closed up loopholes hitherto open to the unscrupulous dealer.

The principal task at Pimlico indeed lay in reducing a chaos of patterns into some sort of cosmos. In early days nine-tenths of the entries in its order books refer to such questions. In 1863 there were over 8000 patterns. By 1914 the number was well below 4000 although, in the meantime, many new types of special garment had been introduced, and several new corps formed. So long as clothing was provided regimentally, there was no reason why that of each regiment should not differ. Not only was there great variety of colour, there were no less than eighteen shades of green facing, but lining materials and other accessories might vary. Chevrons even were of different type and differently mounted. Centralized provision and manufacture made standardization imperative, and assimilation proceeded apace. Necessaries, of which each regiment had its own pattern, became of universal type in 1858, universal patterns of boots were adopted in 1860, the shades of green facing were reduced to five and so forth.

The abolition in 1870 of long service gave a great stimulus to this process. Battalions were linked together and grouped, with their affiliated militia regiments, under territorial titles on a county basis. Each group

¹ This formality only ceased after the Great War. It was an officer of the D.E.O.S.' staff who at that time visited Pimlico weekly, and signed the sealed label on any new pattern. The practice had never obtained in the case of equipment.

had its regimental depot where recruits and reservists were trained and where the latter rejoined in the first instance on mobilization.

But the infantry reservist was at this time liable for general service. He might be earmarked for some line battalion one month and as a Rifleman or Highlander the next, and how to clothe him on recall was a difficult problem so long as there was such a variety of facings, badges, etc. The difficulty was solved to a great extent (though not entirely) in 1881, by a very great assimilation of regular and militia uniform. Indirectly, therefore, the introduction of short service immensely simplified the work of the Army Clothing Department.

Military Inspectors were well qualified to deal with matters such as this, but officers with a five-years' tour of duty at Pimlico were not competent to examine goods technically. When there was question of acceptance or rejection they were inevitably at the mercy of their viewers, some of whom were found guilty of corrupt practices. In 1871 civilian Inspectors were re-appointed, but this time care was taken to give them an adequate rate of pay and to select capable, trustworthy men in whom the trade could place reliance.

When the War Office began to clothe the army, it simply adopted those rules and scales which were in force at the time. The regulations for the provision of clothing, necessities and appointments published in 1857 are very short and simple. After reciting that all demands and correspondence are to be addressed to the Secretary of State for War, there follow the provisions whose growth has been traced in earlier chapters, details of sets of clothing and necessities for each arm, and details of sets of accoutrements and saddlery with their periods of duration. There was still a consolidated annual demand for everything due on April 1st.

But two new paragraphs appear. Yearly accounts on printed forms are required showing the receipts and issues month by month, with the effective strength on the first of each month and the stock remaining on hand at the

end of the year. Demands for articles not replaceable yearly are to be accompanied by the proceedings of Boards of Survey approving the condemnation of what is unserviceable and showing how long the condemned articles have lasted. These new clauses are symptomatic of the disease which began to prey so badly on this business when transferred from private enterprise to government control.

The Clothing Warrant of 1707, prepared under Marlborough's guidance, was intended to protect the soldier from the rapacity of his colonel, and subsequent alterations were framed to define more closely the colonel's responsibility. But so long as the matter was a family affair very few rules were needed.

Now the boot was on the other leg and the regulations were framed to protect the State, not the soldier. The colonel could not be called on to provide anything extra from his off-reckonings. His liability was fixed and immutable, and there was the Board of General Officers to attend to his interests.

But to deal with the State was a very different affair. There was no difficulty in making out a case for increasing the soldier's allowance when it was so clearly demonstrable that what was provided in the past was insufficient. The War Office was unable to refute such an obvious contention. From his colonel the infantryman received in two years two coats, two pairs of trousers and two pairs of boots. Everything else he had to pay for. By 1881 he got three coats, three pairs of trousers, four pairs of boots and two forage caps. In the cavalry the contrast was even greater. By that year everything had disappeared from the list of necessities except underclothes and cleaning kit.

Scales multiplied very quickly and provision was made for special climatic conditions. These refinements all required legislation. Forms of account, checks and counterchecks, grew more elaborate with each year that passed. This was more particularly so because the Clothing Department was a purely civil organization entirely centred in London. Unlike the Ordnance it had

no representatives outside. Generals, especially abroad, had some small discretion to sanction excess issues of equipment and on service their powers had no specified limits. But for clothing they had no shred of responsibility. Even during war the soldier had to pay for anything extra he might consume. Every possible contingency down to the most minute points of detail had to be provided for by regulations.

Other factors tended to aggravate the disease. Short service came in. There were seventy territorial districts in the United Kingdom whose regimental depots held reservists' clothing. The stock of all this had to be regulated at Pimlico. Far more men passed through the ranks. Every soldier's clothing year began on April 1st, though recruiting was spread over the year. There had to be several scales for the recruit according to the date of his enlistment. One would get a small outfit to last him three months, another a full one which was not replaced for fifteen. It was impossible to devise scales suitable for each individual case. Round about April 1st the fever was at its height.

The next change introduced far graver complications. From time immemorial the soldier's clothing, once issued, had been his own property. When replaced, or when he left the army, he could dispose of it as he pleased. In Tudor days, in fact, a portion of his pay had been definitely earmarked as coat money, and one of the scandals at the time of the Restoration was that the discharged man was deprived of his uniform to clothe his successor.

In 1881 this principle was abandoned. Clothing (but not necessities) was made the property of the State like equipment, and the individual was no longer allowed to dispose of it. The reason was that uniform was found to be put to improper use. Discharged men were to be seen begging their bread in the streets, and it was easy for any ne'er-do-well to get hold of a tunic and excite compassion by disguising himself as a broken soldier. Such a degradation of the Royal livery was not to be tolerated. The practice would have been rare before short service threw so many men on the labour market year by year, and

as a matter of fact the agitation that was raised was rather a storm in a teacup, the remedy being much worse than the disease.

The new plan really involved a complete reversal of policy. In principle the soldier's clothing had always been a charge against his pay. From a financial aspect the only change introduced after the Crimean War was to transfer to the public purse that part of his pay previously kept by his colonel to provide a yearly set of uniform. If the soldier was able to abstain from drawing this in kind he was entitled to it in cash. If on the other hand he consumed more, his pay suffered, even though this might not be his fault, as on active service for instance. Now that clothing, like equipment, was the property of the State, the government became responsible that the soldier had a sufficient allowance at all times and seasons. Extra articles were sanctioned to compensate the man for the value of his old garments, and on service the army commander was for the first time empowered to sanction free excess issues in special circumstances, reporting his action to the War Office.

The system was appallingly complicated. Not only was there the stock in the Quartermaster's store to be accounted for, but the life history of every individual article had to be watched and checked at Pimlico from the day it went into the soldier's hands until the day it was finally disposed of as worn out. The remaining life of the part-worn garments of discharged men had to be calculated and they were issued to recruits for proportionate periods. Unserviceable clothing was sold to a contractor who had to guarantee that it should be defaced in such manner as not to be recognizable as the Queen's uniform. The number of forms and returns was prodigious; every item was recorded regimentally no less than twenty-five times.

Having in mind the wide dispersal of the British army over the face of the globe and that control was entirely centralized in London, this was bureaucracy in its very worst form. The plan was universally unpopular. Accounting was most laborious. There was no incentive

to thrift, no compensation for those who were able to dispense with a fresh supply. The fact that the discharged man had to pay for anything not forthcoming even interfered with recruiting. Moreover, whatever precautions the War Office might take, it was always possible to buy uniform in slop-shops at any garrison town.

This phase marks the climax of the disease. Clothing regulations of 1857 form a slender pamphlet of ninety paragraphs, those of 1881 a bulky volume of over a thousand, besides a mass of complex scales and tables.¹ Each subsequent modification tended to simplify matters and decentralize control.

The next new scheme was launched in 1893. Clothing was then divided into two categories, public and personal. Public clothing embraced articles with a considerable life, such as greatcoats and helmets. For these there was no change. They remained the property of the State, and when necessary were transferred from one man to another. Everything else was termed personal clothing, and was again made the property of the soldier. It was to be invariably new when supplied to him and was then finally struck off ledger charge. Compensation was granted for any article which did not require replacement until three months after it was time-expired. Old garments were either retained for use on fatigues, or sold for the man's benefit to the contractor for old clothes. The discharged soldier was allowed to keep his boots and other articles suitable for civil employ, but not his uniform, which was sold for his advantage either to other men or to the government contractor. Finally, in place of a general issue on April 1st, each man's clothing year was made to coincide with the anniversary of his enlistment. Incidentally this was the death of the old practice of holding back the annual issue so as to make a brave show at the general's inspection.

This was vastly better. The man had an interest in making his clothes last as long as he could. Accounts

¹ What an ill name Pimlico gained for "red-tape" can be gleaned from an amusing skit published somewhere about this time—"Red Tape and Rat Traps," quoted in Appendix I.

were immensely simplified. Work was averaged over the year. The annual clothing demand disappeared, and indents were submitted to Pimlico periodically with a view to maintaining sufficient for three months at home or in the Mediterranean, and six months elsewhere. Special scales depending on the date of enlistment were avoided, and all dealings in part-worn personal clothing abolished. The number of paragraphs in the 1894 edition of clothing regulations dropped to 371.

Sir Redvers Buller, who was then Adjutant General, placed two new suggestions before the committee on whose recommendation this change was made. He proposed that clothing administration be decentralized, that stocks be held in every Ordnance depot and that clothing be dealt with by the Ordnance Department in the same manner as equipment. In no other way, he contended, could the Ordnance become conversant with a duty imposed on it in time of war. There would, however, have been difficulty in adopting this suggestion so long as there existed such a variety of uniform. Allowing for differences in rank there were still 139 patterns of tunic alone. The stock at any depot would probably have to be exchanged whenever a relief occurred.

He also recommended that the soldier be given a monetary allowance wherewith to pay for his clothes as he did for his necessities. But to this idea the Director of Clothing demurred. He feared it would be too difficult to fix the allowances, bearing in mind the many branches and ranks in the army, the various scales in different parts of the globe, promotions, transfers and casualties, and fluctuations in cost from year to year. This proposal also came to naught for the time being.

The compensation scheme, however, introduced in 1893, did not work well in practice. It involved very intricate adjustments. Previously compensation was only granted when a whole year's issue could be dispensed with from a fixed date, April 1st. The concession rarely applied, it only affected a few permanently employed men such as mess waiters. Now any individual who could make any single article last for three months

beyond its proper period was entitled to remuneration, the amount of which depended on when it was eventually replaced. These transactions were not grouped, they occurred from day to day and each had to be the subject of a calculation. The soldier's clothing account in fact was partly in kind and partly in cash. It was difficult to check and led to many queries on audit.

In 1909 a far simpler way of dealing with personal clothing was introduced, the basis of which was the allowance system advocated by Buller. By that time the universal service dress was worn on ordinary occasions, which made it much easier to frame allowances. The soldier was given a free outfit for his first year, after which he was credited with a sum every quarter and debited with the cost of such new clothes as he required. Twopence a day, which he at that time received to provide for necessaries and other small charges, was merged in this allowance. The amount varied with the rank and arm, and fluctuated with the cost as given by the vocabulary. But no change was made unless there was a substantial alteration in price, quantity or type. The soldier was credited with his allowance on a fixed quarter day, and thus all clothing transactions took place four times a year in place of from day to day.

This worked admirably. Thrift was encouraged and decentralization carried to its utmost limits. Each unit in fact ran a little clothing shop, demanding what it needed in bulk and selling once a quarter over the counter to its men. Pimlico ceased to be concerned with questions of detail, and scales merely represented what the soldier was expected at all times to possess. On service the system ceased to apply. Each man received whatever sum stood to his credit and clothing was provided free of charge.

Arrangements for providing the extra clothing needed for mobilization developed concurrently with those for equipment. So long as the reservist was liable for general service, it was difficult to devise simple means of fitting him out promptly when recalled to the colours. To do so either his regimental depot must keep a stock of every

variety of uniform on the chance that it might be wanted, or else each unit must carry about sufficient to bring it up to its full war complement. Either plan would have been expensive and unsatisfactory.

The difficulty was solved by a compromise. A stock of undress uniform was held at each regimental depot. There the reservist drew clothing to the bare recruit's scale, and on being posted to a battalion his frock was retrimmed regimentally to accord with the facing colour of the unit he joined. There he received the rest of his outfit from Pimlico, where £200,000 was spent on building up a reserve. The process was lengthy and laborious, and each time a change occurred in the battalions forming the Army Corps to which alone the system applied, Pimlico had to alter the type of uniform in its reserve.

When the reservist was allotted definitely to a regiment matters became easier, for there was then no question of altering the collar of his frock; and in 1890 a further advance occurred. The Director of Clothing was furnished with a confidential list of the units forming the 1st Army Corps, and the number of reservists needed by each, the reserve being of corresponding species and quantity in assorted sizes. On receipt of the order to mobilize, he despatched this automatically. The next step was in 1896 when the Pimlico reserve was distributed among regimental depots where the reservist received his complete outfit before joining his regiment.

But over and above this there was no reserve to meet the wastage of war, and in the opening months of the South African campaign the difficulty of maintaining a sufficient supply was nearly as acute as in the case of guns, ammunition and equipment in general. All sorts and conditions of materials had to be utilized. Of the ten and a half million voted by Parliament to create a war reserve a substantial amount was allotted to clothing; and the introduction of a universal pattern of service dress very greatly simplified matters. Simplicity, in fact, was of vital importance when it became necessary to speed up to its utmost the time in which the Expeditionary Force should be able to mobilize.

Racks were erected at every regimental depot with a separate pigeon hole to contain the outfit of each reservist borne on the books, with boots and clothing according to his registered size. This was perhaps an over-refinement. It entailed a lot of work, for every time one name was replaced by another the pigeon hole had to be overhauled and much of its contents exchanged. Moreover, with the passing of years and the adoption probably of a more sedentary occupation, the reservist's figure was likely to alter. And even so the system continued to have one grave imperfection. A reservist living in London might have to proceed to the Highlands or West of Ireland for his kit before joining his regiment at Aldershot, at the very time when the whole transport system of the country was being strained to its utmost in connection with the embarkation of the Expeditionary Force.

A few other matters remain to be recorded. In 1870, when a Surveyor General of Ordnance was appointed to administer clothing among other matters, the Director of Clothing moved from the War Office to Pimlico. He still corresponded with commands on behalf of the Secretary of State, but, besides dealing with administrative details, became executive chief of the store, factory and inspection branch. When the Commander-in-Chief became responsible for other supply services in 1887, clothing formed an exception. It continued to be administered by the civil side of the War Office under the Financial Secretary.

It was not till 1899 that the Royal Army Clothing Department (the style of Royal was granted in 1895) was transferred to the military side, its administration being vested in the Director General of Ordnance who also took over the Ordnance Factories in that year. It was then that the Army Ordnance Department first had any connection with clothing in time of peace. The intention was to model the Pimlico establishment on the Woolwich system, and treat store, factory and inspection as independent entities. The post of Director of Clothing was abolished. Colonel Mulcahy, A.O.D., was made Chief

Ordnance Officer of the depot,¹ while another officer was placed in charge of the inspection branch. Each of these dealt independently with the D.G.O., and the factory remained as a separate civil branch engaged solely on production under its own Director.

But this threefold organization, well though it might answer for Woolwich with its far greater field of activity, was ill-suited to Pimlico, a much smaller establishment in a ring fence, where the factory was no more than a large tailor's shop. It was cumbersome to keep dual stocks of materials, and in the following year the factory came under control of the Chief Ordnance Officer. Inspection had from the outset been a troublesome business, and the idea of divorcing it entirely from the store and factory was undeniably sound. The officer in charge of a large central depot is frequently anxious to have his stock replenished in a hurry. He should be powerless to bring pressure to bear on those responsible for inspection, the more so at Pimlico, some of whose contractors were small firms of no very high standing.

But, unlike Woolwich, the work was insufficiently onerous to warrant the appointment of a senior officer to superintend this duty alone. One of the C.O.O.'s subordinate officers was detailed from time to time to take charge of the work. The result was that, though the civilian Inspectors enjoyed a high reputation, the viewers who worked under them were often men and women promoted for good service in store or factory who knew little about the technicalities of the articles they had to examine.

Methods of doing business were brought up to date at the same time and on the same lines as at Woolwich. Decentralization was next taken in hand and offshoots of Pimlico were created at certain important centres. Clothing depots were installed at Aldershot and Weedon in 1903, at Dublin in 1904 and Stirling in 1907. The

¹ Major General Sir Francis Mulcahy, K.C.B., a very able officer who joined under the Control Department, followed Steevens' rapid climb up the ladder, succeeding him as Principal Ordnance Officer, and became the first D.E.O.S. when the Army Council was formed in 1904.

C.O.O.'s at these places dealt with demands for clothing from units in their areas and Pimlico had no more to do than replenish stocks quarterly.

When the Army Council was formed, clothing was at first allotted to the Director of Supplies. But the work was by now to a considerable extent in the hands of the Ordnance and was almost immediately transferred to the Director of Equipment and Ordnance Stores. It also became the duty of the Ordnance to deal with all clothing questions in commands. But no further decentralization of stocks occurred. Except for troops served by the four subsidiary depots mentioned above, each unit continued to indent direct on Pimlico under regulations analogous to, though differing in detail from, those governing the supply of equipment and stores.

* * * *

Before closing this chapter, the last dealing with Ordnance administration prior to the Great War, a short survey of the whole field may appropriately be made.

From the earliest times when anything in the way of combined resistance to invasion was contemplated, every man of military age was expected to furnish what he might need if called on to defend his native land. And when a more closely knit organization was introduced by Norman rule, the armoury of each class of citizen was defined by law. We start then with what may be termed *individual provision*, each man for himself.

The next stage was reached when payment was accepted in place of military service, a change destined to produce far-reaching and long-enduring results. A professional soldiery appeared, and to the leader of each body was issued the pay of its men. From this he had to provide for his followers. Thus was introduced *regimental provision*, a system which, except for a break during the Commonwealth, lasted until the Crimea.

But though clothing and such little equipment as was then required could be replenished from local sources when at war, this was not so in the case of arms. Even for bows and arrows some amount of standardization

was important, and for the cannon and musket centralized provision was essential. The Ordnance Office came into being to furnish these. With the growth of army and navy, and the expansion of the British Empire, the Board of Ordnance became one of the mightiest offices under the Crown and Parliament. Into its hands fell the provision of materials for every government service and the care of government lands and buildings at home and in the newly acquired colonies. Nevertheless the commander or organizer of each body of troops continued for long to pay for the muskets, powder and shot furnished by the Board, just as he paid for what he purchased privately. It was only with the birth of a national standing army that concessions began to be granted, and that weapons or ammunition expended in the service of the State were replaced free.

After the Crimea regimental provision was swept away and replaced by *State provision*. For equipment this was the final stage.

But for clothing there was to be a further development. The government in 1906 ceased to do more than manufacture or purchase. Clothing in fact was furnished on the same principle as arms in the early days of the Board of Ordnance, only with this difference. Then it was the leader who received an allowance out of which to pay for what was required, now it was the soldier. *Individual provision* was once more the order of the day.

The compass had been boxed. Originally each man found his own clothes, next they were furnished by his leader, next by the State and finally once again by the soldier. In essence the only distinction between the first and last phase consisted in the substitution of wholesale manufacture and distribution for retail purchase.

The economic aspect of these systems may be noticed. At first any gain from careful management was to the advantage of the man. Then it was the private purse of his officers that profited, and a worse plan it is impossible to conceive. Next it was the State that benefited by any savings that might accrue, though in point of fact under War Office management the cost to the State of clothing

and equipping the soldier increased by leaps and bounds. Among its advantages, and they were beyond question many, economy certainly cannot be claimed. Finally, with an individual allowance, it was once more the soldier who reaped profit by taking care of his clothes.

A comparison of our system with that of other nations is another point of interest. Our fleet having command of the sea we had no invasion to fear, and our small striking force was organized with a view to campaigns conducted from a distant base overseas. For this purpose it was unquestionably wise to concentrate the supply of materials in one set of hands; and despite the vast expansion of our forces in the Great War and the stupendous expenditure of munitions, I do not think anyone will deny that our organization emerged with success from that most searching of all Ordeals by Battle.

The United States, like ourselves, had to work from an overseas base in the war, and their system differed. Our division was between procurement on the one hand—which became the business of the Ministry of Munitions; and storage, supply and repair on the other—the task of the R.A.O.C. Their line of cleavage was at right angles. Two departments also catered for their chief material wants, but each purchased or manufactured what it supplied; and this did not prove so satisfactory.¹

¹ A report by General Parsons, head of our Ordnance in France and made towards the close of the War, reads as follows: "The American Ordnance Department still remains a separate supply organization outside the administration of the Quartermaster General and the Quartermaster Corps. The latter deals with general stores, textiles, clothing, horse transport, vehicles, oils, paints, etc., which with us are included in the duties of the R.A.O.C. The American Ordnance Department to the best of my recollection deals only with technical stores, guns, carriage and such-like, and the personal equipment for the soldier—arms and accoutrements, but it is not a branch of, or officered by, the artillery. It is very much on the lines of the old Indian Ordnance Department before it was re-organized on home lines.

"I frequently discussed the position of the American Ordnance Department with its officers in France, and they all gave me the idea that their particular department was rather 'no man's child,' being outside the big organization of the Quartermaster General's Department. I think they

The great continental Powers on the other hand had a quite different set of problems to face. Their frontiers were co-terminous and often arbitrary, their potential enemies their neighbours, and they maintained vast conscript armies. A different organization was better suited to these conditions. Their troops could remain in war directly based on the arsenals or depots that fed them in peace ; there was no bottle-neck through which everything had to filter as with us. Secondly, military expenditure figured so largely in their budgets that, unless military efficiency was to go to the wall, domestic economy had to be ruthless. Thirdly, linked with this, was the fact that it was not necessary to study the comfort of the conscript as we, with our small volunteer army, had to do to get recruits. Regimental provision, abandoned by us after the Crimea, was retained on the Continent, it forced the regiment to interest itself in economy ; and the supply of materials was distributed among several branches, each manufacturing or purchasing what it dealt with.

To take France as a model. The artillery organization corresponding to our defunct Board of Ordnance remained responsible for munitions ; her engineer and medical services furnished what special equipment and requisites they needed ; and her Commissariat—the Intendance—supplied the troops with clothing, accoutrements and other non-technical gear on a monetary basis, dealing also with finance and purchases or impressments in the theatre of operations.

Regimental provision, as it existed (and presumably still exists) in the French army, certainly has the advantage of cheapness. With us the unit has no direct incentive towards economy ; the interests of officer and private over uniform are in theory diametrically opposed. The desire of the one must be to see his men turned out smartly, that of the other to save as much of his clothing

experienced difficulty in the dispatch of their stores by rail and in fitting them in with the numerous commodities being sent to the front by the Quartermaster Corps, and they all gave me the impression that our organization for Ordnance services was superior to theirs."

allowance as possible. In place of this individual allowance, the French regiment receives a block grant—the off-reckonings of other days—but none of which goes into the colonel's pocket. This has to cover all expenditure other than that on arms, ammunition and other technical equipment; in fact it constitutes a family housekeeping fund. All are in the same boat, and the grant has to be made to go as far as possible in the interests of the regiment as a whole. Uniform, accoutrements and other articles, the patterns of which must be standardized, are obtained on repayment from government stores; others required in large numbers (horse-shoes can be cited as an example) under the terms of regional contracts made by the Intendance; and odds and ends by direct purchase.

The administration of the fund (*masse*) is in the hands of a regimental committee which, subject to certain rules, has a free hand in deciding how it should be spent; how much on clothing, how much on saddlery, how much on new pots and pans, paint and putty, on facilities for recreation and so on.¹ No cash passes. The regiment is credited periodically with its allowance, according to its arm and strength. On this side of the account also appear any profit it can make from the sale of old materials, manure, cast horses, etc. Against this is debited the value of what it obtains either from government or private sources.² At the year's end the credit

¹ In the interests of efficiency, the minimum to be expended on new boots and leather work is laid down. Also expert inspections of equipment and clothing are more thorough than with us, where they are confined mainly to mobilization equipment. How this came about will be obvious from the account of the growth of mobilization equipment given in the last chapter—but it is absurd; what really should be inspected is what is in daily use, not what is kept under a glass case.

² As an example of how this tends to economy I might say that the French regiment does not buy water bottle covers. It makes them from its own condemned blankets, and the soldier has to be content with an inferior article. The ragged condition of French troops was often commented on by British officers who saw them on manœuvres, and in particular the patched state of the harness. But it must be borne in mind that a complete new outfit was held for each man and horse borne on the establishment and only taken into use in time of war.

is carried forward and on service the account is closed and everything replenished free.

We could not possibly adopt this plan to the extent to which it obtains in France. There service is compulsory even though the soldier's welfare may suffer should the regiment administer its "masse" badly; and in France each regiment has a permanent peace station and can equip its barracks for all time as it pleases.

But there is no reason why we should not adopt the system to a limited extent for many forms of household expenditure and other small matters. Any measure tending to replace bureaucratic by regimental control would be beneficial. In spite of all our War Office reforms the army continues to have no incentive to economy. Proposals are put forward without heed as to their effect on the income tax. To get as much as possible out of the Ordnance is almost a tradition.¹

In their report the Esher Committee, when recommending the formation of an Army Council and some decentralization of War Office functions, criticized the policy previously in force as being based on the assumption "that all officers are necessarily spendthrifts," a theory which "is largely responsible for the unreadiness for war frequently exhibited, as well as for reckless and wasteful expenditure." They also hoped to lessen "the interminable correspondence which wears out the energies of officials and unfits them for their proper duties."

This trenchant criticism was followed by reforms that were a step in the right direction. They gave the upper hierarchy in each command some measure of financial and administrative freedom. But they did not go far enough and left untouched the irresponsibility of the regiment. No exterior departmental check could be as effective as the bond which united in a common interest the provider and user when the colonel had complete responsibility

¹ Since these lines were written I see that steps are being taken in this direction. Regiments are being credited with part of the savings they may effect on certain domestic utensils. I fancy I am right in saying that the idea first originated from a report I made to the War Office after the War, describing the French system.

for his regiment and the Board of Ordnance and Respective Officers between them looked after fortifications and armaments. Scales and regulations can effect small savings; but they cramp initiative and do not promote economy in its truest and broadest sense. The question the regimental officer asked himself was still rather "what can I get?" than "what do I need?"

And when scales went by the board, as they needs must largely do in time of war, he found himself quite untrained to appreciate financial values. During the Great War the conservation of materials became of paramount importance; but the missionaries sent out to preach the gospel of economy found it hard to obtain converts.

Finally the connection between the different methods of administration and the welfare, or in other words the efficiency, of the army provides serious food for thought. Though the soldier's status in society has always been founded on that of the peasant or labourer, yet it has at times been well above the average, at others far below.

With individual provision in early mediæval days we start with a well paid soldiery, the archer a cut above the common clod.

Next comes regimental provision, and simultaneously a process of degeneration sets in. The soldier becomes a hireling, warfare is conducted by bands of mercenaries, the pressgang appears, the jails are scoured for recruits.

The third scene is an interlude. The soldier of the Commonwealth is a citizen of repute, and his clothing is provided under Parliament. It is inspected for quality by City Guilds.

After the Restoration regimental provision in its worst form is once more the order of the day. The colonel sweats an income from his soldiers' backs. Marlborough makes a brave attempt to deal with the scandal. His orders become a dead letter. Additional burdens are laid one by one on the man's shoulders. His plight is perhaps at its worst in the latter part of the eighteenth century. Burke's Bill of economic reform and other reforms early in the next century indirectly lead to slight improvement. But they are merely palliatives. The system is

unchanged, the disease is only checked, it is not eradicated. The army continues to be recruited from the very dregs of society.

Then follows the Crimea with its wanton waste of life. The nation at last awakes from its apathy and comes to the rescue. The cancer is cut out root and branch, and the State undertakes to provide for its army. Regeneration speedily follows, and from that day to this the status and well-being of the soldier have never ceased to improve.

The association between the system in vogue and the condition of the army is too intimate to be accidental. But what is their relationship? How far have forms of government or religion influenced events? How far have they been dictated by environment and circumstance? To what extent does mankind control its destiny? Would Napoleon have created an Empire if born out of his age? Would Luther have remained an orthodox priest, Cromwell no more than a country gentleman, or Lincoln a provincial lawyer?¹ Such questions afford a fruitful field of enquiry. They are of absorbing interest as a mental exercise, but do not admit of definite answer. Much depends on the point of view, whether subjective or objective. Cause and effect are so closely interlaced. They act and react the one upon the other until it is impossible to say exactly—this is a cause, that an effect.

The reasons why the profession of arms should at one time be held in high esteem and at another be degraded are many and varied. And the good or ill fortune attaching to a military career, combined with the state of public morality, would inevitably react on army administration and tend to make it clean or corrupt. To this extent the application of the system would be an effect of the military ethics of the age.

¹ Compare, for instance, Lord Lister, perhaps the greatest modern benefactor of the human race, especially the army, with the unknown Hungarian Semmelweis. In the very year in which Lister began his investigation into the cause of hospital diseases, Semmelweis, engaged on the same problem, died, driven mad by despair owing to his colleagues boycotting his efforts. There was this great difference. Pasteur's investigations had commenced when Lister started work.

But the essential feature of the system, whether it involved individual, regimental or State provision, must have the nature of causation. It is beyond question that the abject condition of the eighteenth-century soldier was in the main due to his colonel being enabled to reap a profit from his miseries. It is equally certain that the vast and continuous improvement that has followed the Crimea is due to the soldier being transferred to the more tender care of the State.

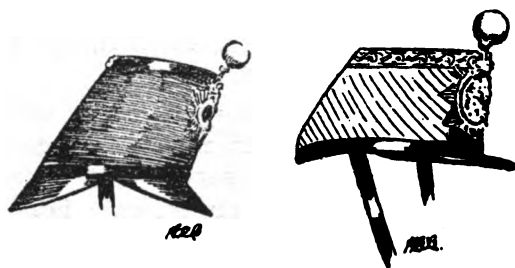
Whatever the blending of cause and effect, it can be asserted without a shadow of doubt that the administration of what are now Army Ordnance Services has played a very important part in determining the welfare of the soldier and the efficiency of the British army.

CHAPTER XIV

DETAILS OF UNIFORM, EQUIPMENT AND ARMS

ALTERATIONS in uniform since the Crimea have been in a very different direction from those of the previous hundred years. Then every change had as its object to strike the eye or conform to some passing fad or fashion. Now comfort and serviceability were the objects aimed at.

As was natural, the two articles against which opinion mainly revolted were the coatee and chaco. The one was



replaced in 1855 by a double-breasted skirted tunic with lapels, only to be superseded in the following year by a single-breasted tunic, similar to that worn in 1914. But, from a natural revulsion to the tight coatee, it was at first loose with a low collar cut away at the throat. Since then, the tendency was again to heighten the collar and make it a better fit. Although the chaco was not abolished, it was very greatly modified. The height was reduced eventually to four inches in front and it was much lighter and better shaped to the head. In fact it was modelled on the French képi, by which name it was often called.

Before chronicling subsequent changes, it will be well, as a ground work, to describe what the soldier's uniform then comprised, without entering into elaborate details; for the object is only to trace the broad line of evolution. The predominant colour of the tunic was red, but for artillery and some cavalry dark blue, and for rifles dark green. The Lancer tunic was double-

breasted, that of the Hussar had bars of lace across the breast. In Highland regiments the coatee was replaced by a doublet, and Horse Artillery wore a richly laced jacket, cut short at the waist. There was no great change in any of these garments in the years that followed.

For head-dress the Infantry had the chaco, Foot Guards a bearskin cap, Fusiliers a similar cap of sealskin (it was of lamb's skin till 1866), kilted regiments a feathered bonnet; Rifles, Artillery, Engineers and Hussars a busby; Lancers their distinctive cap with a neck and flat top; heavy cavalry a gilt or steel helmet with a falling horse-hair plume. The Scots Greys, however, retained their fur caps, worn almost from time immemorial.

The Infantry trouser was very dark grey with narrow red stripe, that of the Artillery and Engineers blue with a broad red stripe, and for the Rifles dark green. Highlanders had the kilt or trews. For mounted men there were two types of striped overall, plain for dismounted duty and strapped with cloth at the knee when on horseback, worn over Wellington boots. The usual colour was blue, but in some regiments red. The Household Cavalry had jackboots and leather breeches as well for ceremonial parades. Dismounted men wore ankle boots, but kilted regiments, shoes and spats. The mounted man was provided with a loose cloak, the colour being blue, except in the Life Guards where it was red; the foot soldier had a grey greatcoat, but blue for gunners and sappers.

Undress uniform comprised the stable or shell jacket; white for the Foot Guards and Highlanders, otherwise the colour of the tunic, with a round forage cap. Highlanders, however, wore the glengarry or Kilmarnock bonnet. In India and other tropical stations, a white jumper and trousers were commonly worn in the hot season, with a peak and white cover to the forage cap.

State provision soon resulted in changes, the first

being in 1856 when the Highland stocking made of woven tartan stitched together, which sorely chafed the feet, was replaced by knitted hose.

1862 was a year of many innovations. Leather leggings were provided for all dismounted men. Those in the Far East were supplied every second year with a loose serge frock of the colour of the tunic, in place of the latter, and serge trousers. The forage cap was to be provided with a cover and peak in all hot climates. That garroting apparatus, the stock, was replaced by a black leather tab to cover the opening of the collar. The mounted man was given a cape and belted cloak with sleeves; and as a concession, he was allowed to wear his cape, and the infantryman his greatcoat, when off duty. Special garments for active service were sanctioned, warm underclothing for the cold, a serge frock with light underclothes for the tropics, and cholera belts everywhere. But this was rather a tentative step; the clothing was only to be taken into use when necessary, and replaced at the soldier's expense. Nor were arrangements made to maintain a stock of such special articles.

The first mention of a tropical helmet appears in 1858. Various patterns were tried, at first with a framework of wicker or cane and a felt covering, then in 1868 constructed of cork covered with white linen. With these a paggri was worn at a few places. The soldier for long had to pay for this helmet and a universal pattern was not adopted till 1876.

Those in Canada, exposed to the other extreme of climate, were provided with fur cap, fur-lined fingerless mitts, a comforter and substantial knee-boots (Canada pattern) with which a couple of pairs of socks could be worn.

In 1865 a new infantry greatcoat was adopted; a far better and more substantial article, costing £1 2s. 9d. against 14s. 6d., the price of the old coat. A detachable cape was added in 1869.

In 1868 a universal type of glengarry was introduced, replacing the round forage cap of the line for all except

staff sergeants and warrant officers whose cap was peaked. This was much more serviceable and was carried on the line of march strapped flat against the knapsack.

In 1870 leather strapped pantaloons and knee-boots were tried with success in the artillery. In 1873 they were adopted universally for all mounted troops, and the booted and cloth-strapped overall disappeared. This was another sensible change. Nothing could have been more absurd for cross-country riding than overalls. They were simply a survival of the fashion of an age which discarded knee-breeches.

A measure even more purely utilitarian was the replacement of the now smart-looking chaco by an ugly home pattern helmet which, though not so becoming, afforded better protection. A pattern of blue cloth covered helmet with spike, plate and curb chain was sealed in 1877¹ and became the universal full-dress headgear for all dismounted troops except the Guards, Fusiliers and Highlanders who retained their fur caps, bonnets or chacos.

Meanwhile, the serge frock came gradually into general use for undress until eventually, in 1881, the stable jacket remained only for Cavalry and Horse Artillery at home, and the shell jacket for the Foot Guards and Highlanders for whom it had always been an article of clothing and not necessities. This also was a boon to the soldier, who now had a loose-fitting frock to wear in barracks or on fatigues in place of a tight jacket.

In 1888 a design of field service cap appeared, intended for all troops who still wore a round forage cap. But it was not taken into general use till 1894, the forage cap being kept as well for walking out. The field service cap looked smart and was serviceable. In many regiments officers already wore a cap of this sort in mess kit. Not

¹ For Light Infantry regiments and Rifles, the colour was green. In 1881 the spike was replaced by a ball in the artillery. By 1886 the colour for Light Infantry was blue, and in 1900 Rifles were once more given a busby. The old chaco introduced in 1800 eventually survived only for the Highland Light Infantry and Scottish Rifles.

only could it be packed up flat, but it had flaps capable of being turned down to protect the head and ears in rough weather. After a while a chin strap was provided for mounted men. In 1896 this replaced the infantry glengarry as well, except for Scottish regiments.



One other all-important article must not be omitted from this survey. Although there was no accentuated change of pattern in the marching soldier's boot, there was a constant and steady improvement. The ammunition boot of the Crimea had been a byword. It was of the poorest materials wretchedly put together. By the end of the century army kip and army grain were actually used in the trade to specify some of the highest grades of leather on the market, and the army boot had a reputation only equalled by that of the best London made-to-order article. This was not a matter within the competence of the Adjutant General. The credit for the vast improvement lies with the Army Clothing Department and Inspection Division at Pimlico.

It will be seen that the tale of these years is very different from that of the past. It bespeaks an attention to health and comfort scandalously disregarded when such matters were left to a Board of General Officers and to the colonels. These great improvements were born of the sufferings of the troops at the Crimea. Nor did matters end there, another series of reforms was maturing at the same time, but before mentioning these a few minor changes may conveniently be disposed of.

In 1862 the terms grenadier and light company were abolished and their last petty distinctions of uniform disappeared. In 1865 cavalry uniforms were supplied cut out and trimmed, instead of in the form of piece

materials. This continued until 1895 when they were provided with ready-made clothes like the rest of the army. In 1867 red piping replaced the narrow stripe of the infantry trouser. In 1871 the infantry private's tunic became for the first time scarlet, in place of the brick-red of the past. In 1878 whistles were introduced for sergeants. In 1880 chevrons of rank were ordered to be worn on the right arm only, and badges of good conduct on the left. Finally, early in this century, there were once more attempts to enliven the tunics of various dismounted branches, such as one is wont to associate with the reigns of the Georges. The collar was cut square in front which made it less comfortable, and extra buttons and piping were added to the back of the skirt. The intention was to stimulate recruiting, but it would almost seem as if these last sorry efforts were designed to throw ridicule on such proceedings, the portion of the tunic selected for decoration on this occasion being that which covers the soldier's posterior.

To return to more serious matters, the series of changes described above may be said to have been in the interests of individual welfare, those which follow in that of general efficiency. The latter were in the first instance brought about by the Cardwell reforms of 1870, which created a body of reservists liable (in the infantry) to serve in any regiment and for whom it was so difficult to provide uniform so long as there were such divergencies of pattern.

In 1871 a universal button bearing the Royal Arms was introduced, infantry bands, who wore white, were re-clothed in red, and regimental patterns of lace, which still survived for the drummer, were replaced by universal patterns. This was followed in 1881, owing to the territorial system of grouping regiments coming into force, by a great standardization. Facing colours were reduced to four; blue for Royal regiments, white for English and Welsh, yellow for Scottish and green for Irish. Regiments hitherto without an emblem were given a Rose, Thistle, Shamrock or Dragon, according to their nationality. Territorial titles replaced numbers and remov-

able metal badges those of embroidery. Including militia, no less than 160 battalions changed their facings owing to their being linked with others; 202 new badges were introduced and 688 abolished.¹

The introduction of short service led to another and even more important change in the same year. It was very difficult to provide full dress rapidly for the large influx of men who would rejoin on mobilization, and hardly less so to maintain the supply necessary for an army in the field greatly in excess of peace strength. The tunic was tight, it took long to make, and even then required some fitting to the individual. The frock was loose and tailoring quicker and easier. Again the kersey of the frock took five weeks to manufacture as against eight for the comparatively fine cloth of the tunic. Moreover it was acknowledged that kersey was better fitted for the rough work of campaigning than the more delicate cloth. Thus, on every count the frock was preferable on active duty. It was simpler to outfit the reservist, was more useful as a garment and maintenance was easier. It was therefore decided to make it the regulation service dress jacket for the ordinary marching soldier who hereafter left his tunic behind when he went to war.

Red, however, was still looked on as the orthodox colour for war as for peace. Indeed, in 1880, inducements were held out to Volunteer Rifle Corps to exchange their more sombre hue for red. But the old tradition that the soldier should be trapped out in his best on the field of battle was waning and was soon to suffer total eclipse.

Whereas we had adopted green for Rifles with a view to concealment, the Indian army had for some time past used khaki, which signifies dust colour. This was worn by the Corps of Guides as early as 1848 and was very

¹ Rifles, however, kept their green or black facings. These steps were most unpopular in the army, and later on the number of facing colours was increased in deference to the traditions of certain regiments. For instance, the Buffs insisted in colouring their white facings buff and were allowed to resume that hue.

inconspicuous in the general atmosphere of India. In the Abyssinian campaign of 1868, organized by India, the British infantry were ordered to appear in khaki on the day of the advance on Magdala, so evidently it was then worn to some extent by British troops in India.

A War Office Committee which investigated the visibility of various colours reported well on khaki, though it preferred a medium grey. Khaki, however, was firmly established in India, and in 1883 definitely replaced white drill as the summer undress uniform of British troops in that country. Some clothing of this colour was also provided at Gibraltar, and for five regiments at home, as a trial. Grey serge frocks and trousers, sealed as patterns for the Egyptian campaign of 1882, were replaced in 1886 by khaki with drab cord breeches. Later, its use was extended to Sierra Leone. At Singapore there was an alternate issue of khaki and white, while white alone was provided at Hong Kong and Ceylon. In 1887 a pattern of khaki puttee was approved, and in 1894 a khaki cover for the white helmet. Thus khaki drill was gradually becoming the recognized material for summer undress in the tropics.

But, with the exception of South Africa, it was in those very places where it was chiefly worn that all our fighting in the last half of the century occurred—India and Afghanistan, Egypt and the Soudan, the East and West Coasts of Africa. The linesman no longer wore a tunic in war, and thus khaki became recognized as the regular garb for a campaign in a hot climate.

During a period of transition, scarlet and khaki were worn side by side. In the Afghanistan campaign of 1878–80 coats of both colour were to be seen with full-dress trousers, breeches or kilts. In the Egyptian campaign of 1884–85 khaki was common, though cavalry kept their scarlet coats with khaki breeches. Actually the traditional British red coat made its last appearance in battle at the engagement of Ginnis on December 30th, 1885, when the Soudan Field Force were clad in red serge with blue trousers and puttees, so as to make a greater impression on the Dervishes. It is worth reflection that

this was the very reason why the ancient Briton stained himself with woad.

It was in these Egyptian campaigns that two new accessories were first employed. Sun-goggles were supplied for that of 1882, and an antiseptic field dressing was approved for active service in 1884.¹

Means of identifying the dead and wounded were first employed in the South African War, in the form of a linen slip carried in a pocket inside the jacket. The slip, however, was useless if the man changed his coat, and an aluminium disc, fastened round the neck by a cord, was substituted in 1906. The last refinement, officially introduced in 1910, was the spine pad to protect the backbone from a tropical sun when no coat was worn.

To return to the main subject. In 1898 an experimental scale of clothing was introduced for all troops serving outside the United Kingdom, except in Canada, which included khaki drill frocks and trousers and Bedford cord pantaloons, and thus, when the Boer War broke out in the following year, it was in this that our troops took the field. But the drill proved too thin and before the end of the year was replaced by drab serge.

Lastly, in 1902, the momentous decision was taken to abolish the scarlet coat and striped leg wear for every purpose except full-dress in peace. The principle then introduced was to provide a smart ceremonial uniform

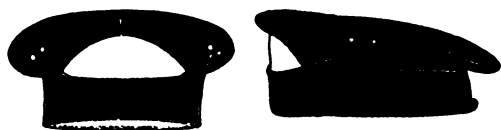
¹ A field dressing was first used by the Prussians in the war of 1870. Each soldier, as part of his kit, had a tin of dressings bearing his number, so that it served also as an identification disc. But it was not antiseptic. Hospital gangrene and pyæmia were prevalent as in the Crimea, and the surgeon's knife still a greater danger than shell or bullet wound. Our first dressings were made up as follows :—

1. Two pads, 4 ins. by 4 ins., containing carbolized tow.
2. Carbolized gauze bandage, 2 yds. in length, 4 ins. in width, with one safety pin.
3. One triangular bandage, unbleached calico, 40 ins. by 34 ins., carbolized, with 4 pins.

These articles were made up into a package about 4½ ins. in length, 3 ins. in width and 1 in. in depth; the whole being enclosed first in a wrapper of tinfoil, and then in a cover of parchment paper, secured by paste impregnated with half per cent of corrosive sublimate.

and cap for walking out, and fustian as a workaday costume. The latter was to be roomy and comfortable, light enough for ordinary foreign service or in warm weather at home, and suitable for winter wear with thick underclothes.

The material selected was that which had proved suitable in South Africa, and service dress as first introduced was constituted as follows: a greatcoat without cape, treated so as to render it more or less rainproof; a jacket with title embroidered on a strip on the upper arm, trousers with puttees in place of leggings on foot, Bedford cord breeches with brown leather gaiters on horse, ankle boots and a wide-brimmed felt hat for all. The gaiters, however, were only experimental: they were quickly replaced by puttees; and the cowboy hat, borrowed from Canada, soon disappeared. The Highlander was provided with a drab apron to his kilt and drab spats. The patterns were universal, the same throughout the army, which immensely simplified provision and supply; and for summer wear in hot climates there were universal patterns of khaki drill and helmet.¹



Full-dress remained as before; but the red, blue or green serge frock replaced the tunic abroad, except in Canada, and disappeared elsewhere. The smart cap for walking out, however, was at first anything but smart. It was the Brodrick, universally condemned by the army.²

The colour was blue with a patch in front of the facing

¹ The short infantry legging and cape survived only for the Foot Guards, and the Household Cavalry kept their long cape, relic of the old sleeveless cavalry cloak.

² This was an adaptation of a German pattern like that worn by German troops in the Great War. A German officer has related that at the time of its introduction the Kaiser, impressed by the smartness and serviceability of our field service cap, had ordered a few hundred to be made in Berlin. But when he heard that we had copied the German cap,

colour, and a drab cover with a peak attached was added when in service dress. Only the Highlander managed to evade this atrocity by keeping his glengarry, and the Guards, who had a cap of their own, somewhat similar to the Brodrick.

In 1905 the Brodrick cap was discarded and replaced by the present patterns, blue for wear with the tunic, and drab for service dress ; and this is the last change in uniform of any substantial importance to be recorded.

There were a few minor modifications to the soldier's accoutrements shortly after the Crimean War, but they were too trivial to merit description. Except that a waist-belt had been substituted for one of the two cross belts, the equipment was similar in general design to that carried at Waterloo.

By now far more marching order parades took place and it began to be recognized that the equipment caused great distress and even gave rise to disease of the heart and respiratory organs in young soldiers. But it took long to decide on a substitute. There were many trials, and matters were postponed owing to the fact that a new rifle with different ammunition was under consideration. Thus it was not until the Martini-Henry rifle appeared in 1871 that a new equipment was introduced.

Complicated and awkward as it seems to our eyes, the valise equipment pattern 1872 was a great improvement on anything that had gone before. For the first time the problem of how best to adjust the soldier's various burdens was studied as a whole, and the different straps shaped and proportioned to the work they had to do. The essential features were that the pack ceased to be carried as an independent load slung from two short straps,

he decided it would be undignified to adopt what our military authorities had condemned. We had an idea about this time that everything German must of necessity be the climax of military efficiency, and no doubt this was largely so. But it was apt to result in a slavish imitation. We imported the German officer's frock coat, quite useless to our officers who only wore uniform on duty, and his blue-grey greatcoat for the Foot Guards and senior officers, which was no better than our own khaki.

and that the ammunition was no longer in one large pouch behind the back. The pack and greatcoat were fastened instead to braces, which passed over the shoulders and were attached to the waistbelt in front by short adjustable straps. The Martini-Henry rifle had a smaller calibre, and the quantity of ammunition carried in full marching order was increased to 70 rounds. Of these 40 rounds were divided between two pouches looped to the waistbelt in front, one on either side; and the remaining 30 carried in a ball bag, a supplementary container which could be slung from the right-hand brace adjoining the pouch. Thus the weight of the pack and



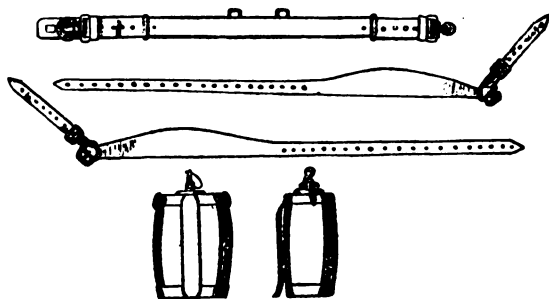
greatcoat on the back was balanced to some extent by that of the ammunition, with the shoulder as a fulcrum, and there was no belt pressing against the chest.

There were also steadying straps on either side to confine the load to the back and prevent it from jolting about when on the move. No fewer than four straps took off from the front of the right brace. One joined it to the waistbelt, another to the ball bag and two more to the valise and greatcoat. In fact, the soldier was swathed in leather.

The equipment was designed to meet a variety of purposes. On sentry-go the belt alone was worn, with

bayonet and frog and one pouch shifted round to the back of the belt. The greatcoat could be carried without the valise or vice versa. With mess tin, second pouch, ball bag, water bottle and haversack added, the soldier was in full active service marching order, the cape being under the flap of the valise and the glengarry flat against the greatcoat. It was these refinements that made the equipment so complicated.

In 1874 what was known as the Italian pattern water bottle was introduced. This was cut from solid wood and, being oval in section, was more convenient to carry than a miniature barrel. It was provided with a carriage of buff leather and worn on the right-hand side slung from a buff strap over the left shoulder, opposed by the haversack.



In 1882 a new equipment appeared which was far simpler and gave greater freedom. It consisted of nothing more than two long braces buckled to the waistbelt in front by short straps. After passing over the shoulders these were fastened to the upper extremities of the valise. They then crossed at the back and were buckled to its lower extremities. Thence the returning ends passed round the man's body and were attached in front to their points of origin. Thus by tightening up the ends, the pack (now situated higher up) was pulled into the small of the back, and the braces themselves served as steadying straps. When, however, the equipment was worn without the valise, the rear ends of the braces were fastened to dees at the back of the belt. The numerous

punched holes admitted of great adjustment and this was a very simple and comfortable equipment. The pack was larger and squarer and contained the greatcoat, the cape was either inside or strapped below, and the mess tin on top. Also the water bottle was secured to the belt by a spring clip and, when specially ordered, it was surrounded with felt to keep the contents cool.

With this equipment, 80 rounds of ammunition were carried in two 40-round pouches provided with collapsible gussets. Older pouches had been of blocked leather, lined with tin, but this was no longer necessary. Ammunition was now in a waterproof metallic cartridge which was not fragile like that made of cardboard.

The next pattern of equipment was introduced in 1888. It was not nearly so comfortable, but had one great advantage. The valise and greatcoat could be removed without the man having to divest himself of his strappings. The braces were in three pieces, a broad portion to go over the shoulder with narrow ones in front and rear, fastened to the waistbelt. The greatcoat was carried rolled on the lower part of the back attached to the waistbelt with the mess tin above, the cape being inside the pack. The valise, in consequence high up on the shoulders, was provided with straps at each extremity which buckled to the braces in front and behind so that it could be removed by merely undoing the fastenings. But the result of its being so high up was that the weight was a direct pull on the waistbelt, which could only be kept from riding up in front by being worn extremely tight. This was the cause of many falling out on the line of march. At every halt men were to be seen hunching their shoulders in an endeavour to get the pack up to its proper place and the buckle of the belt down.

The quantity of ammunition was reduced to 70 rounds. The right-hand pouch held 30, of which 10 were loose in tubes immediately ready for use, the left-hand pouch 40 rounds, all in packets of 10. At the same time, a water bottle made of enamelled iron was adopted, circular and flat, completely covered with felt, and once

more carried by a strap over the shoulder passing through loops in its circumference.

In 1889, with the advent of the Lee-Metford rifle, of even smaller calibre than the Martini-Henry, new patterns of pouches appeared. That on the right-hand side held 40 rounds, two packets of 10 and 20 cartridges in tubes, of which two were on the outside so as to be immediately available; that on the left 50 rounds, of which 40 were in packets and 10 in tubes. In the following year the 40-round pouch was replaced by one of 50. The amount of ammunition had then risen from 60 rounds to 100.

All this time accoutrements continued to be made of stout buff leather, or enamelled for the higher ranks, except in the case of Rifle Corps, whose equipment was entirely black.

For mounted services changes were few. In 1862 a rifle bucket was adopted in which the carbine was carried muzzle downwards, the bucket being subsequently altered and improved to suit new types of carbine. The waistbelt with its sword slings was of buff and to a buff cross belt was fastened an enamelled black pouch behind the back. This held 20 rounds, but was modified to take 30 with the advent of the small-bore Lee-Metford. The sword continued to be carried on the person on foot or on horse until 1889, when a frog was introduced by means of which it was attached to the left rear of the saddle when mounted. This led to the sabretache, whose sole use was to keep the sword steady, being discarded.

The next type of equipment was due to the war in South Africa which, combined with a charger-loading rifle for which ammunition was carried in clips, led to drastic changes. In imitation of the Boers we re-adopted the bandolier discarded two hundred years previously when cartridges were invented, brown leather replaced buff, and webbing made its first appearance. It was necessary in this war for columns to be able to move rapidly and unencumbered, and the intention of the new equipment, introduced in 1903, was to strip the soldier of everything not absolutely essential for fighting.

There was a brown leather waistbelt with bayonet frog and two leather pockets in front on either side, one holding two five-round clips of ammunition and the other three—fifty rounds all told. The greatcoat was high up on the shoulders in a web carrier, the front ends of which hooked to the ammunition pockets. The rear end of the carrier was secured to the mess-tin cover which in turn was looped on to the back of the waistbelt. A brown leather bandolier worn over the left shoulder, with a steadying strap under the waistbelt, accounted for a further 50 rounds of ammunition in five pockets, each holding 10 rounds in clips.



A new canister-shaped water bottle was provided with this equipment, holding one quart instead of $1\frac{1}{4}$ pints, and provided with a carriage. The valise was discarded, the haversack being the sole receptacle for odds and ends. Extra clothing was carried in a "bag spare field kit" on a baggage wagon. This war was notable for the extent to which mounted infantry was employed. The lance was laid aside and the weapon mainly relied on by mounted troops was the rifle. On horseback a ninety-round bandolier was worn in place of the buff pouch belt, having five pockets in front and four behind, with a plain brown leather waistbelt.

There had always been two schools of thought as to what the soldier should carry. Some emphasized the importance of the troops being fully self-sufficient and

independent of their auxiliary services, contending that a man separated from his knapsack runs a grave chance of never seeing it again. Others were prepared to take this risk with its consequences, owing to the greatly increased marching capacity. In the Russo-Japanese War of 1904, both sides discarded some of their kit. The Japanese used coolie transport to bring knapsacks forward to the advancing troops. The Russians ordered greatcoats or kit-bags to be carried in carts, as the weight of fifty-six pounds reduced the mobility of the troops who were unable to march and fight under the load.

The experience of both combatants coincided with our own during the last phase of operations in South Africa; and at this time our aim was to have the soldier carry as much ammunition and as little else as possible. Trials were even made with as many as eight fifteen-round pouches on the belt. With the bandolier and an emergency 50 rounds in the haversack this would give him 220 rounds available on his person.

But the pendulum soon swung the other way. Continental warfare would be a very different matter to the pursuit of Boer commandos. Even then experiments were in progress with a new type of equipment with which the pack reappeared; a new load, the entrenching implement, being added. This equipment was made entirely of webbing which has the advantages of being softer and more elastic, adjusting itself more readily to the body than leather. Webbing is also cheaper, but on the other hand is more liable to need repair, a serious disadvantage in time of war. It is also more costly in the long run as it does not last so long. The web equipment pattern 1908, with which our troops were equipped in the Great War, is too well known to need description. But it may be said that it is the most comfortable and best fitting equipment our army has ever possessed. So well balanced is the load that it will keep its position even if the waistbelt be unbuckled. The pack is once more in the centre of the back and the 150 rounds of ammunition distributed about the chest in five fifteen-round pockets on either side, so as not to impede expansion of the lungs.

Service dress being the order of the day, white and black disappeared and the whole of the army had drab-coloured accoutrements.

The weights carried at this time were as follows :—

<i>Infantry.</i>		<i>Cavalry.</i>	
	lbs. ozs.		lbs. ozs.
Clothing worn on the person	14 11	Clothing (necessaries, etc.)	26 3½
Arms	10 8½	Arms	13 7½
Ammunition	9 0	Ammunition	6 0
Tools	2 9½	Accoutrements	5 12
Accoutrements	8 4½	Rations and Water	5 13½
Articles in pack	10 1½	Saddlery, etc.	44 12
Rations and Water	5 13½	Rider (say)	150 0
	<hr/>		<hr/>
	61 0½ ¹		252 1

The years that followed the Crimea constitute a period of great activity in the field of experimental small-arms. Including carbines and pistols there were actually 32 different types in the service by the year 1866, of which 21 were for the Imperial army and navy and 11 for India, which still relied largely on smooth-bores for native troops.

The Enfield with its .577 bore, of which there were several patterns of rifle and carbine, was the ordinary regulation weapon; and the latest model, that of 1860, incorporated a new feature of incalculable advantage. It was the first weapon made strictly to gauge. If any component broke there was no need for the armourer to make a new one, the parts were interchangeable. Regiments were granted an annual allowance of spares and all that was necessary was to fit a new component.

Some of the new arms possessed quite novel features. In the Lancaster carbine, with which the engineers were equipped in 1855, the bore was a slightly elliptical

¹ During the Great War this figure rose on occasions to as much as 100 lbs., an entirely uneconomic load that limited the infantryman's radius of action to a few miles.

spiral. The ordinary ammunition was used, and the expansion of the lead on discharge forced the bullet to conform to the shape of the barrel, thus imparting spin. In the Whitworth rifle, first tried in 1854, the barrel was a hexagonal spiral with rounded corners and the bullet, made of a harder metal, was of the same shape. It was in fact a mechanical fit. The whole surface of the barrel was effective in imparting rotation to a projectile which required no expansion. Although made with a calibre as small as .451, there was no danger of the bullet stripping, even though the twist was increased to one turn in 20 inches.

This was the most accurate weapon of its time. Queen Victoria opened the first meeting of the National Rifle Association, founded in 1860, with a Whitworth rifle, hitting the mark within $1\frac{1}{2}$ inches of the centre at a range of 400 yards; and until the Martini-Henry was evolved, the Queen's prize was always shot for with this arm.



In its smaller bore and more rapidly rotating bullet of a harder metal, the Whitworth was in fact the forerunner of the modern rifle. But excellent as it might be for a match rifle, the system was not well adapted for ordinary service use. It was necessary that the barrels and ammunition should be very mechanically exact, otherwise the bullet would jam. Manufacture was difficult and expensive. The Whitworth was only adopted experimentally and used chiefly by Rifle Corps.

More enduring and therefore more important features are to be found in the new arms employed by cavalry. There were rifled pistols with revolving chambers by Colt, and Deane and Adams; and no less than four types of breech-loading carbine. Of these, however, only one, the Westley Richards, was extensively used.

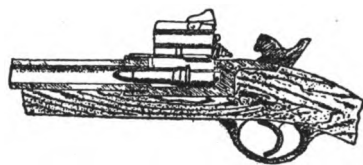
The substitution of a breech-loading rifle for a muzzle-loader was indeed the great problem of the age. The Prussians were the first to make the change in 1848, with very successful results in their war against Denmark in

1864. In this weapon the cap, embedded in the cardboard cartridge, was pierced by a needle when the trigger was pulled. The most obvious advantage of the breech-loader was that it increased the rate of fire. There was no cap to be placed on a nipple, no need to bite the cartridge to free the powder, and no ramming. Not only was the actual operation of loading much quicker, but it could be effected in any position, such as when lying on the ground. Also it was easier to clean the bore and remove fouling, it was impossible to insert two cartridges by inadvertence, there was no chance of some of the powder being spilt, and ignition was more certain with the cap in contact with the charge.

The Prussian army had the advantage of possessing the first small-arm actually designed as a breech-loader. We, with our more modern Enfield, hesitated to incur the expense of scrapping such an efficient weapon. There was also a prejudice against the breech-loader on the grounds that it would lead to waste of ammunition. But the success of the Prussian arm, and the fact that the French were adopting a similar type, could not be ignored. We could not afford to be left behind in the race. A reward was offered for the best way of converting the Enfield into a breech-loader and the prize was gained by an American, Mr. Snyder, in 1866. Here, however, a difficulty cropped up. The breech being merely closed with an improvised lock did not entirely seal the escape of flame to the rear, and the firer's face was very apt to be scorched. A metal cartridge became necessary, and it was not till the next year that a satisfactory case was produced by Colonel Boxer, a great artillery expert. This was formed of a metal cup, in the base of which was a cap and anvil, and from which sprang a coil of brass sheet wrapped round the powder and lower portion of the bullet. When the piece was fired, the expansion of the powder pressed the joins of the coil together and prevented the escape of gas. England was thus the first country to adopt a metal cartridge. Having solved this problem, we proceeded at once to convert our Enfields into Snyders. By March 1868, 350,000 arms

had been so dealt with, the process being accelerated by the marked superiority of the Prussian needle-gun over the Austrian muzzle-loader in the war of 1866.

The process consisted in fitting a hinged block at the breech, which turned over on a longitudinal axis. Through the centre of this block there passed diagonally a long pin which, when struck at the rear by the hammer, fired the cap in the cartridge. Opening the breech-block eased the cartridge which was then removed either by hand or by turning over the rifle.



At the same time a number of new arms were made on the Snyder principle in which steel was first used for barrels instead of iron.

The Snyder, however, was recognized as being only a stop-gap. It by no means exhausted the advantages that might be gained by loading from the breech. Entirely new designs of breech-loader were being examined even before the conversion of 1867, as may be seen from the various carbines tried by our cavalry.

With a muzzle-loader, there must be clearance between the bullet and barrel to enable the projectile to pass down the bore. With a breech-loader this is not necessary, the portion of the barrel where the bullet lies can be recessed. Herein is an essential and all-important difference. The bullet can be an accurate fit, and not require expansion to force it into the grooves. It no longer leaves the muzzle as a rather shapeless mass of lead. A harder metal can be used that will keep its form. Again, the charge being permanently enclosed in the

cartridge instead of being poured down the barrel, it can be regulated to the greatest nicety. The whole problem in fact can be studied more scientifically. It would be out of place here to go into the intricacies of rifle ballistics, a subject on which a mass of highly scientific literature exists. But this much can be said. The flight of a bullet is arrested by the resistance of the air, and this resistance varies, at ordinary velocities, directly with the square of its diameter and inversely with its weight. It is therefore an advantage to have a small calibre. But a smaller and consequently lighter bullet requires more spin to keep it truly centred. This could not be given with the ordinary muzzle-loading type of projectile, the soft lead of which would have stripped instead of taking the grooves. The harder bullet that could be employed with a breech-loader, however, combined with a suitable form of rifling, enabled the difficulty to be overcome.

A smaller calibre than the Enfield was thus possible, with a bullet longer and better centred, and with a greater range owing to the decreased resistance of the air. This in turn would give a flatter trajectory, increasing the zone of danger in the path of the projectile. It would also reduce the unpleasant jar of recoil, a factor that led to inaccurate aiming. Further, the soldier could be provided, weight for weight, with more ammunition. The increased rate of fire of a breech-loader made this very important.

But the extent to which the reduction can be carried has obvious limits. The weight of the bullet affects its ballistics as well as its diameter though to a less degree, and it has an important bearing on its penetration and man-killing properties at long range when the velocity is falling off. From this point of view the harder metal that can be used for the bullet of a breech-loader is an advantage, but too hard a substance might not take the grooves and would tend to increase windage. The form of rifling enters into this aspect of the question. The three deep grooves of the Enfield might be suitable for a soft bullet. But with a harder substance, numerous

shallow surfaces are preferable. They grip the shell at many points, are less liable to fouling and erosion and easier to clean. All these factors act and re-act one on the other. If too much stress is laid on any one particular point, some other must be sacrificed. The design of a rifle, like that of any complex mechanism, can only be a compromise. In addition, there was the best form of breech mechanism to consider. This might be of two types ; either a falling block or a bolt locked by a turn, after the manner of a door bolt, as in the Prussian rifle.

The War Office Small Arms Committee investigated these various points anxiously and critically and was well advised in deferring to propose an entirely new arm until satisfied that it had evolved the very best type that could be found. After all, the converted Enfield was a good and serviceable weapon in its way at the time, and the expense of replacing it throughout the army very heavy.

Finally, in 1869, it was decided to adopt a breech-loader with a barrel designed by Mr. Henry and a mechanism by Mr. Martini ; the Martini-Henry rifle being introduced into the service in 1871.

The calibre was .450 and the barrel in section had seven flat surfaces with a similar number of projections. The breech mechanism consisted of a block, hinged above at the rear, which contained the striker, actuated by an internal device instead of a hammer. To open the breech, a lever under the trigger was depressed. This lowered the front of the block and also set in action an ejector, shooting out the previous empty cartridge. The top of the block was grooved to facilitate the entrance of a fresh round and the raising of the lever then closed the breech-block, its action also cocking the striker. The mechanism contained a safety device, so that the rifle could be carried without danger of its going off. The Martini-Henry weighed 8 lbs. 12 ozs. and was sighted up to 1400 yards. It was undoubtedly the best weapon of its day—precise, accurate at a long range and fool-proof.

With this reduced calibre a cylindrical cartridge would have been too long and slender, so the rifle was given an enlarged powder chamber and bottle-necked

ammunition. The bullet was of harder metal and had a waxed wad behind it. This sealed windage, lessened erosion and lubricated the bore. In 1885 difficulty in extraction was reported from Egypt and a solid-drawn cartridge case, punched from a block of metal, replaced the rolled case.

In 1886 it was decided to reduce the calibre of the Martini-Henry to .400 so as still further to increase the range and flatten the trajectory. But before this proposal reached the manufacturing stage, the action of other countries made it necessary to consider the adoption of a repeating rifle.

The Turks first demonstrated the advantage of this principle in their war with Russia in 1877-78. Then the best known repeater was the Winchester, of American make, mainly intended as a sporting weapon. It contained a number of cartridges in the stock, which were passed one by one into the breech as each round was fired. It was a Winchester rifle that the Turks used, but the mechanism was far from fool-proof and apt to jam. Single loading was impossible and each round altered the balance.

A mechanism patented by another American, Mr. Lee, during the years 1879 to 1882 was much more successful. This had a bolt action and the cartridges were contained in a magazine underneath. Each time the bolt was pulled back, the last round was ejected and replaced by another. The bolt was then shot forward and turned, when the piece was again ready to fire.

It was inevitable that a magazine rifle should result in greater expenditure of ammunition. Both the soldier and the echelons containing reserves must be able to carry a larger allowance. For this reason, and also to increase the range, it was necessary to reduce the calibre to the utmost extent possible without sacrifice to man-killing power. In 1888, after many experiments, a .303 rifle with the Lee bolt-mechanism and magazine and the Metford system of rifling, was issued for extensive trial throughout the Empire. After certain minor modifications had been made, this was adopted in the following

December as the Lee-Metford magazine rifle Mark I; and, so far as general principles go, this type and calibre of small-arm have been in use ever since. The magazine held eight cartridges at first, but the number was later increased to ten.

With this very small bore and increased range, a greater speed of rotation was again required. The twist of the Enfield had been one turn in 78 inches, that of the Martini-Henry one in 22 inches. In the Lee-Metford there was a turn in every 10 inches. This would have caused anything except a very hard metal to strip, and the new projectile had a leaden core enclosed in a sheath of cupro-nickel. The form of rifling was even less pronounced, a series of seven smooth curves free from all sharp edges. But the bullet weighed 215 grains compared with the 480 of its predecessor, and though the muzzle velocity had risen from 1350 feet per second to 1850, the hard pointed shell had less stopping power than was desirable. A new bullet was therefore introduced in which the sheath covered the outer circumference only, the lead being exposed at the head which had a hollow point. This was used in our campaigns against savages, but the original type was reverted to at the time of the South African War, an expanding bullet being contrary to the usages of civilized nations.

Meanwhile the propellant had come in for its share of attention. Ever since the firearm was invented, gunpowder alone had been used, and though it was by now very carefully prepared, its most objectionable feature, fouling, had never been eliminated. It had other disadvantages as well. The important points about a propellant are that it should produce a high velocity with as regular a pressure as possible over the full length of the barrel, that its action should be uniform so as to attain similar results in every case, and that it should be safe and durable in any climate. Gunpowder, being a mechanical mixture of charcoal, saltpetre and sulphur, could not be absolutely uniform and imperfectly fulfilled all these conditions. Moreover the improvement in the rifle introduced two entirely new factors. With

their long-range arms, troops fought at such distances apart that concealment was vitally important. It was useless to give them khaki on service if their situation was to be revealed to the enemy by puffs of smoke every time they fired ; and the cloud of smoke prevented advantage being taken of the speedy rate of fire possible with a magazine rifle.

Science in its rapid march during the latter part of the nineteenth century had produced many chemical compounds which were in an unstable condition. That is to say, under the application of force in the form of a blow or heat, they would resolve into their constituent elements, giving off immense energy in the process. The action of some of these substances, such as the detonating composition of the cap of the cartridge, was too violent to be suitable for a propellant—it would have shattered the breech of the rifle. There were others, however, whose energy could be more effectually harnessed. The French army had adopted a nitrogen compound propellant about 1885, and in 1891 we followed suit with cordite, a substance with a nitro-glycerine base.

This was so called because it was made in the form of a thin cord, afterwards cut up into little sticks. It produced no smoke. By regulating the diameter of the cord, in conjunction with the air space in the chamber of the rifle, any given rate of burning could be arrived at. It was safe to handle, only exploding when confined. It stood variations in climate well. It did not produce any appreciable residue. Being a chemical compound, the relationship between its constituent parts was exact and it was therefore very uniform in action. As there was little fouling with cordite, greased wads were abolished and the cannellure of the bullet was filled with beeswax to eliminate windage.

Cordite gave rise to higher temperature in the bore than gunpowder. It was apt to wash away the grooves, and the Lee-Enfield rifle with a modified form of rifling, five curved surfaces in place of seven, was introduced in 1895 to overcome this weakness.

The next step was the adoption, in 1903, of a shorter

and lighter charger-loading rifle, for which five rounds were held together in a clip. By this means the magazine could be more quickly filled and the chance of loose rounds being lost was diminished.

The last change occurred in 1910 owing to a desire to add still further to the range. A new charge of cordite was introduced with a bullet having a very elongated head to decrease its resistance to the air. But it was impossible to increase the total length of the bullet without danger of its turning over in flight. The streamline form necessitated a decrease in weight from 215 grains to 174 ; but, despite this, the new shape combined with the new charge increased the range, the muzzle velocity rising to 2400 feet per second. The weight of this rifle was 9 lbs., or 10 lbs. 0½oz. with its bayonet.

The latest type of small-arm to appear on the scene was the automatic. There is nothing new under the sun. These were matchlock muskets with spiral grooves, and ancient attempts to devise a percussion fuze. The very oldest guns were made of wrought iron before the art of casting them was understood, and were breech-loaders. There is at the Rotunda at Woolwich a breech-loading rifled cannon with six grooves of the year 1547 and also a model of an antique machine gun.

But a gun of this type really first made its appearance as a service weapon in the Franco-German War—the French mitrailleuse, which had a number of fixed barrels capable of firing 30 to 50 rounds a minute. After this the market was flooded with ideas and inventions. We adopted the Gatling gun in the navy, ten barrels revolving round an axis, and then the Gardner, where they were side by side. These were soon after replaced by the Nordenfelt, also with the barrels side by side, the best of its kind at the time. These guns were all operated mechanically, either by turning a handle or moving a lever from side to side. They were of super-calibre and none were really satisfactory. A chief difficulty was to keep them steady and aimed straight, while a handle was being cranked or a lever pushed to and fro.

It is a curious fact that so many inventions for

destroying human life, including the machine gun which proved the most death-dealing contrivance of all in the Great War, came about this time from the United States, the country of all others which had least cause to fear invasion. A serviceable automatic weapon was never devised until Hiram Maxim, an American, invented the machine gun which bears his name, and which first saw service in the Matabele campaign. In this the energy of recoil of the barrel was very ingeniously employed to provide the force needed to work the mechanism. All that was necessary was to hold the gun straight. One barrel, surrounded by a water jacket to keep it cool, replaced the two or more of older types, the ordinary small-arm ammunition was fed to the breech in a belt, and the gun continued to fire so long as a button was pressed. The mechanism is too intricate to describe. It must suffice to say that the recoil of the barrel ejected the empty cartridge, replaced it by another, closed the breech and then cocked and fired the gun, each operation being performed with lightning rapidity, while a deadly stream of bullets poured from the muzzle. Shortly before the Great War the Maxim was replaced by the Vickers, a modified and lighter Maxim. The Maxim originally weighed 60 lbs. whereas the weight of the Vickers was only 32 lbs.

The advantages of an elongated projectile are even greater for the gun than for its smaller sister. The flight of shell and bullet are subject to the same general law, the best type to overcome the resistance of the air being that which combines the smallest diameter and surface with the greatest weight, and both require to be properly centred to be accurate at any distance.¹

¹ It was only because the shell travelled at an immense height, where air resistance is far less, that the Germans were able to shell Paris in 1918 from a distance of 76 miles. The feat was quite without precedent. So little was known of the effect of the attenuated air resistance at this great distance from the crust of the earth, some 22 miles, that the Germans themselves had little idea how far the eight-inch gun they employed would range. When first tried at their Meppen ranges all trace of the fall of the shell was lost until an old woman, living ten miles away from the target, lodged a complaint that it had landed in her back garden.

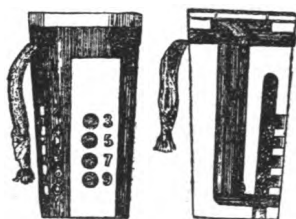
For the bullet there the matter ends, but the projectile of the gun has other work to do. The shrapnel is a collection of bullets. Given the same calibre, an elongated shrapnel will contain many more bullets with greater man-killing effect. Similarly the common shell will hold a larger bursting charge and produce more destructive fragments. The solid shot again can be provided with a pointed nose which, with more metal behind it, will have far greater penetration. Then, so long as they are spherical, all three will weigh differently and consequently range differently. Elongated projectiles can be all of the same weight, by making one or other longer or shorter. The effect of a round shot can only be increased by magnifying its diameter and adding immensely to the weight and unwieldiness of gun and carriage, and to make large castings without flaw was wellnigh impossible.

Yet rifled guns did not come into use until a considerable time after rifles had definitely proved their marked superiority over muskets. At the Crimea the smooth-bore gun, with its round projectile which progressed up the bore by a series of bounds and rebounds, was actually at a disadvantage with the small-arm for accuracy at anything but point-blank range. It is true that a few guns made on the Lancaster principle were tried at the Crimea, but the shot jammed in the bore ; and hexagonal bores, attempted soon after, were an equal failure. The problem of design was altogether one of greater magnitude and difficulty.

One all-important adjunct of the gun, however, was radically transformed at the Crimean period : the fuze which so far had consisted merely of a piece of slow match cut off to a certain length by hand. This could not be trusted to burst shrapnel at the right moment, and the effect of common shell was reduced when they might fail to explode for an appreciable time after arrival.

In 1849 Colonel Boxer, the inventor of the metal small-arm cartridge, designed an entirely new type of fuze which, with certain modifications made after trial, was introduced into the service in 1854. This consisted of a tapered wooden cylinder with a solid base,

so that there was no longer danger of the contents setting back into the shell, causing it to explode prematurely when the piece was fired. In fact it was to overcome this danger that the fuze was originally designed. A central channel was bored from the upper and larger surface of the cylinder to within a short distance of its base, with a number of smaller channels round it, bored from the base nearly to the top. Outside the cylinder a series of holes was punched from top to bottom, communicating at intervals with one or other of the outer channels, but not penetrating to the centre one. The central channel was filled with a slow-burning composition communicating at its head with strands of quick match wrapped round the outside. The other channels were filled with quick-

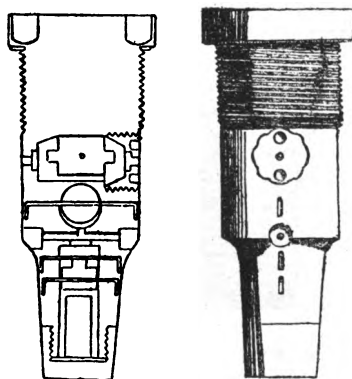


burning composition, and the holes bored in the outside of the cylinder plugged with putty. A paper cover was wrapper round the fuze marked in seconds or fractions against each hole, the series of numbers forming a spiral from top to bottom. The head and base of the fuze were also covered as a protection.

The action was as follows. The time the fuze was required to burn was first calculated. The appropriate hole was then bored right through with a special implement (a hook-borer), so that one of the outer channels communicated with the slow-burning core at a definite point. The fuze was then jammed into the opening of the shell. Before ramming home, the covering of the quick match was torn off. When the gun was fired, the match was set alight and the composition in the central core began to burn until level with the hole that had been bored through. It then fired the quick-burning composition which in turn exploded the charge in the shell.

So satisfactory was this fuze that it remained in use until nearly the end of the century, subject to one important modification to be presently mentioned. Prematures were avoided. It was safe; the operation of boring of cutting the older fuzes was always attended with a certain amount of risk. The time required to prepare the fuze was shortened, it burnt more regularly, and a few standard sizes replaced the many lengths previously used. The two commonest burnt up to nine and fifteen seconds respectively.

Three years before Boxer brought out his time fuze, one designed to act on impact for use with common shell



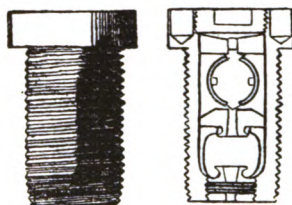
had been invented. This, the Freeburn fuze, is only worth mention as being the first percussion fuze adopted in the service. It was ingenious, but was made of wood, an unsuitable material for a percussion fuze requiring working parts, and seems to have been little used.

In 1851 a metal percussion fuze, the Moorsom, appeared, designed on quite different lines. This had three chambers. The two upper contained cylindrical hammers at right angles to each other, capable of horizontal motion, and having a nipple at each end facing a patch of detonating composition. The third chamber below also contained detonating composition and a hammer capable of vertical motion. The hammers were normally kept from contact with the composition by wires passed through them. The shock of discharge

sheared the wires and set the hammers free. The impact of the shell caused one or other to strike a cap and fire the shell. This fuze is of interest as being the first fired by the action of a hammer striking a cap. It was also the first to be provided with a screw-thread, the aperture of the shell being bushed to correspond.

But the Moorsom fuze with its three chambers and hammers and patches of composition was very expensive and complicated, and was superseded by the Pettman, designed by a laboratory foreman of that name, and first tried in 1860. This was far simpler than the Moorsom and held its place without rival for some time after elongated shell, travelling nose first, had simplified the problem of design.

The Pettman fuze consisted of a metal cylinder closed



at its head and base by screwed plugs, the base plug having an aperture leading into the shell and containing quick match. Inside this cylinder were two recessed plugs, one at the top and the other about half-way down, which gripped in position a gunmetal ball provided with projections to fit the recesses. The complete unit, two plugs and ball, was held immovable by a leaden cup resting on the base of the fuze. The ball was roughened and coated with detonating composition which was also pressed into a groove round its diameter. The shock of discharge crumpled up the lead cup, the two plugs and the ball set back, the lower plug still gripping the ball. But with the irregular motion of a round shell the ball became displaced in flight and lay over in one corner. Then, when the shell struck, the ball was dashed violently against some part of its chamber, the composition was detonated, and the flash passed through the hole in

the base plug, the process being assisted by the quick match.

But with rifled guns and properly centred shell, then just coming into use, the ball was apt not to get dislodged during the flight of the projectile. It had to be made so sensitive as to be apt to explode the shell should it graze a wave on its way to the target, an undesirable quality when firing at sea. With a shell travelling fuze first the problem was much easier, and a direct action fuze came into use, much simpler than the Pettman. This had a hammer permanently fixed in the head just below the surface, underneath which was a detonating cap. The lower part of the fuze contained a quick-burning composition capable of penetrating into the shell through holes in its base. The top was provided with a brass cover, easily removable by giving it a turn. This safety device was removed when the gun was loaded. Direct impact crushed the hammer into the cap composition, exploding the shell.

The Boxer time fuze was the next to be modified. When more efficient methods of sealing windage were discovered, the flash of discharge could no longer be trusted to pass round the wall of the shell and ignite the strands of quick match. The fuze was provided instead with a hammer in its head, suspended by a safety pin and a thin wire over a detonating cap. Before ramming home the pin was removed. When the piece was fired, the inertia of the hammer sheared the wire and the hammer struck the cap which set fire to the slow-burning composition.

These early time and percussion fuzes have warranted a detailed description, for they are the prototypes of all the many patterns that appeared afterwards and which I shall not attempt to describe. Metal replaced wood for the time fuze, with an annular channel of slow-burning composition instead of a core, times of burning being marked on the circumference. The fuze had no longer to be bored and could be reset to a different time when necessary. Various forms of lead cup, crushed by the shock of discharge, were introduced and various forms of

hammer and cap, safety pin and shearing wire. There were combined time and percussion fuzes, fuzes so sensitive that they would act on graze, others that would not fire the shell except on direct impact, others again with a delay action. Naval armour-piercing shell required a base fuze which would only explode after penetration inside the armour of a battleship. But these were all modifications of the original types described above. The sole device of a quite novel character incorporated in some of the more modern fuzes was the centrifugal bolt. This was ordinarily pressed inwards by a spring, locking the working parts. But when the shell attained a certain speed of rotation, centrifugal force caused the bolt to overcome the resistance of the spring and fly outwards, setting free the mechanism. This ingenious contrivance proved very safe and effective.

From this description of the evolution of the modern fuze I return to the gun.) It was Lord Armstrong who, in 1859, produced the first rifled cannon firing an elongated shell which was a success, by employing entirely new methods of construction and a breech-loading system. The Armstrong gun was not a solid casting, it was built up scientifically. The foundation was a steel tube open at each end and with an almost continuous series of small grooves, steep on their cutting edge, in order to bite into the soft surface of the projectile. Over this were shrunk and locked, when hot, wrought iron hoops or jackets, so that the interior of the piece was ordinarily in a condition of compression. The first result of firing was therefore to restore the metal to a normal state, before it was called on to resist pressure. The longer and consequently heavier shell required a larger charge to propel it, and this ingenious plan provided great extra strength without increase of weight. But little was known about metallurgy in those days, and the steel barrels were not at first a success. They were for a time replaced by cast iron, though ultimately steel won the day.

At the breech end of the gun was a slot into which fitted a heavy faced block with a vent communicating with the chamber, which was lifted in and out by hand or

slid to one side. After loading, it was jammed up tight by means of a large screw, situated behind it and actuated by two arms with weights at their extremities to give extra momentum. Even so, accidents would happen owing to the block flying out when the piece was fired. The projectile was slightly larger than the bore which was recessed at the breech to receive it. It was at first made entirely of lead, and next of iron with a lead coating to take the grooves. In front of the cartridge was a special lubricator, two tin cups soldered together and filled with a mixture of tallow and linseed oil, to help in cleaning the residue of lead and fouling from the grooves.

These rifled breech-loading (R.B.L.) guns were very accurate, and the advantages of the elongated projectile self-evident. It was therefore decided to rifle our smooth-bore muzzle-loaders by cutting a few deep grooves down the barrel and equip them with long shell and shot, provided with brass studs pressed into recesses in the wall of the projectile to fit the grooves. But the stress set up in overcoming the inertia of the heavier projectile, combined with the loss of metal at the grooves, was more than the guns would stand. The conversion only became possible in 1863 by fitting rifled tubes of wrought iron or steel inside the barrel.

Expert military opinion in fact remained in favour of the muzzle-loader. It was simpler, lacked complicated parts liable to get out of order, cost less to make and maintain and could be fired quicker than the Armstrong gun. These considerations were held to outweigh all others, especially for a field gun, although the crew was so much more exposed when loading at the muzzle. The Prussians had a breech-loader in the Franco-German War, and more than 200 of their field guns were put out of action by defects in the mechanism. At the other end of the scale was the unwieldiness and danger of the breech-block of a large gun. It was in the medium size that the R.B.L. was to be found, the forty-pounder being the commonest.

Nevertheless, Armstrong revolutionized the system of gun construction and converted it into a science.

In 1870 rifled field guns with inner tubes and wrought iron jackets were introduced—9-, 12- and 16-pounders—provided with carriages and trails of iron plating instead of wood. The main development, however, lay in the immense increase of size possible for a gun built scientifically of wrought materials instead of being a solid casting. The largest piece in 1860 was the 80-pounder of five tons, that of 1880 the 81-ton gun, with a calibre of sixteen inches. This was followed by the 17·72 inch of 100 tons, the largest size attempted.

The old wooden garrison carriage could not carry these heavy pieces and gave way to iron carriages mounted on traversing platforms, higher at the rear than the front, up which the gun carriage slid on recoil. To enable it to be run up again into the firing position by gravity, the carriage was provided with rollers on eccentric axles which only came into bearing when a lever was applied. To further check the recoil of the larger sorts, other frictional devices such as plates pressed together were employed. These, however, were all superseded by the simple and effective buffer, consisting of a cylinder, closed at one end, and with a central hole at the other, inside of which worked a piston whose rod protruded through the hole. The cylinder was attached to the platform and the rod to the bottom of the carriage (or vice versa) in such manner that when the gun recoiled the piston was withdrawn. The buffer being filled with oil, the recoil was checked by the rate at which the oil could pass through apertures bored in the piston. Such in its first simple form was the buffer which is now a general feature of the modern gun carriage.

The mountings of these heavier guns were traversed by winch handles; they had better designed elevating gear, and the guns were provided with derricks at the muzzle to lift the projectile, the 81- and 100-ton gun being worked by steam power.

One new mounting of this period embodied an ingenious idea of making the recoil do useful work, invented by Colonel Moncrieff. In this system the force was employed to raise the gun up into position behind a

high parapet, so as to protect its crew while engaged in sponging out and reloading. The carriage, mounted on a traversing platform, consisted of two long rockers with trunnions for the gun at one extremity and a heavy counterweight at the other. When free, the gun pointed over the parapet and the counter-weight lay between the brackets of the platform. The action was something like that of a rocking-chair when tilted backwards. The force of the recoil brought the gun down, still in a horizontal position, where it was held by automatically acting clips, and raised the counter-weight. When loaded, the clips were released and up went the gun again. The layer had an elevated post and climbed down before the piece was fired from below.

During this period the mortar became obsolete, the howitzer was neglected and types of projectile were standardized. Canister, grape, bar and chain or red-hot shot disappeared, and case-shot was rarely used. Guns were now so seldom fired at close quarters, even in the field, that case-shot was eventually superseded by shrapnel with a very short fuze. The fewer types of projectile in the limber, the simpler the ammunition supply. Shrapnel was the field artillery shell *par excellence*. The head was secured to the body where it became cylindrical, and the bursting charge, which displaced the head and freed the bullets, was sometimes in front and sometimes behind. Both methods had their advantages. With the charge in rear, a forward impulse was imparted to the bullets, but a central channel down the shell was needed to carry the flash of the fuze to the charge. With the charge in front, there was room for more bullets but no forward impulse. Eventually the forward position won the day. The common shell filled with powder and with a percussion fuze was the siege artillery projectile, and the solid Palliser shot that of the fortress gun where penetration was required. This had a pointed nose of chilled and hardened cast iron, a method of casting invented by Major Palliser in 1863. A Palliser shell, constructed on the same principle, also existed.

The studs on these muzzle-loading shell necessitated

a few deep grooves. The guns, especially the larger sort, scored badly and soon became inaccurate. This weakness was overcome by the gas-check, a copper plate with a wide edge, similar in shape to the section of the shell and its studs. It was loosely secured by a nut to the base of the shell so as to be free to revolve and not hinder loading. The soft edge of the gas-check was expanded by the powder gas which could no longer rush past the wall of the shell eating away the metal. The next step was to make the gas-check itself impart spin to a studless shell whose base was rounded off and serrated. The automatic gas-check gripped the shell when the piece was fired, the two rotating together. This enabled the gun to be given many shallow grooves in place of the few deep ones which weakened it, just as the recesses for the studs had weakened the wall of the shell.

Scoring of the vent was dealt with by providing copper renewable vents which were screwed into a bushed hole bored radially into the breech of the gun. This operation, which required a skilled mechanic, was the sole repair these muzzle-loaders required, and the mountings needed little attention beyond seeing that the buffer was properly filled and adjusted.

Gunpowder was originally of two kinds only, fine and large grain, but with the elongated shell a new sort, pebble, appeared. The pebbles being larger, burnt a trifle more slowly and provided the more gradual impulse desirable when overcoming the inertia of the elongated shell.

Such then was the development of the gun and its ammunition down to the year 1880. But in 1878 trial had been made of an entirely new sort of gunpowder pressed into large blocks or prisms of considerable size. Not only did this yield greater uniformity, it developed greater power when burnt in a chamber with an air space. The rate of combustion, however, was correspondingly slower and to get the maximum effect needed a very different sort of gun, one long and slender instead of short and fat. A long muzzle-loader, however, was out of the question for the broadside of a man-of-war. It could

not be run back sufficiently far inboard to load, and the navy was our prime concern. Moreover about this time there was a revolution in expert opinion in favour of the breech-loader, which had been improved and adopted by France and Germany. Having both ends open made it easier to manufacture and rifle and easier to load, the gun crew was less exposed, windage could be more effectually sealed, and the danger of accident from smouldering remnants of cartridge was lessened. The great increase in range and power possible with a long gun using slow-burning powder clinched the matter and we followed suit.

The German breech mechanism, designed by Krupp, was a wedge, something after the manner of the Armstrong block, but better secured and worked by a lever. The French system was a block which screwed into the breech. To allow it to be opened and closed quickly, portions of the thread were slotted off both on the block and the breech. When the screwed portions and those slotted corresponded the block was secure. When given a partial turn the slotted portions on the block corresponded with the threaded parts of the piece and vice versa, the block being then free. It was opened or closed in four motions. The first released a safety catch and eased it ; the second gave the necessary turn ; the third extracted ; and the last swung it to one side on a pivoted carrier.

This, the interrupted screw system, was the one on which we decided, and the new type was called B.L. to distinguish it from the Armstrong R.B.L. The vent passed down the centre of the breech-block, towards the front of which was a cushion of asbestos and fat to seal windage. The gas-check was replaced by a driving band, a copper band pressed into a recess near the base of the shell, and slightly larger than the bore.

By 1880 steel had entirely replaced iron in gun construction, as it did subsequently for projectiles, and the first all-steel B.L. gun in the land service appeared in 1883, a 12-pounder of 7 cwt., the arm of both Horse and Field Artillery. But in any process of re-armament the navy held pride of place ; and except for this, we

continued for years to come to possess a very heterogeneous collection of muzzle-loaders in the land service. There was never any general scrapping of old types, which would have been a very costly process. For instance, when I joined the army at Dover in 1889 the armament, of all sorts and sizes, ranged from pre-Crimean smooth-bore 32-pounders, firing nothing but case-shot, to two 81-ton monsters in an armoured turret at the end of the pier, loaded, elevated and traversed by steam power.¹

In the summer of that year my battery went through a siege course, there being no regular siege batteries. First we went to Chatham, where we practised various manœuvres, such as dragging guns behind steam tractors. Thence we proceeded to Lydd to carry out practice with 25- and 40-pounder guns and 6.6-inch and 6.3-inch howitzers, all muzzle-loaders, the last named little longer than a mortar. Here a captive balloon, a great novelty, was used to observe fire. Many experiments were carried out with lyddite which was then being tried as a shell filling. This was much more violent in its action than gunpowder and very safe, in fact the great difficulty was to get a complete detonation. The experiments were successful and lyddite was adopted for filling common shell.

These personal reminiscences will show how slowly re-armament progressed; indeed muzzle-loaders remained in use till far later.² I first saw a B.L. gun in

¹ Captain Hadcock, the Inspector of Ordnance Machinery, whose special care was this equipment and who had already made a name for himself, at this time applied for a vacant post at Woolwich Arsenal for which he was eminently qualified. But if the Ordnance Department was a hunting ground for senior artillery officers in want of a job, the Ordnance Factories were a close preserve for gunners who had passed through the Artillery College and his application was refused. By this short-sighted policy the Government lost the services of Sir Albert Hadcock (as he later became), who rose to be our greatest expert on artillery designs; for, seeing his advance blocked, he resigned his commission and joined the great armament firm of Elswick.

² In 1908 I witnessed the last shot fired from a 100-ton muzzle-loader at Gibraltar. It was, however, really obsolete, and only retained until the last round of ammunition was exhausted.

action when I joined the Field Artillery in 1894, the 12-pounder on the simple carriage introduced eleven years before. 6-inch and 9.2-inch B.L. guns, however, were being erected in a few of the most important fortresses by 1890, the mountings of which embodied another idea of Colonel Moncrieff's for utilizing the energy of recoil. The gun, in a circular pit with overhead shield, was erected on two pivoted arms upheld by a ram working in a cylinder full of liquid, which communicated with chambers of compressed air. The recoil forced in the ram, the liquid from which flowed into the air chambers, still further compressing their contents, the gun at the same time being brought down horizontally into the loading position under cover of the shield. The cylinder and air chambers were connected by a non-return valve, so that the air remained in a high state of compression, storing the recuperative force which re-erected the gun, when again loaded, by opening a by-pass valve. This hydro-pneumatic mounting was not entirely satisfactory as it required constant expert attention. It was difficult to regulate the pressure correctly and there was great liability of air and liquid mixing. This produced an air cushion under the ram which, combined with the heat generated in compressing the air, led to irregular and sometimes very violent recoils.

By 1890 a new method of gun construction was being adopted. In place of shrunken steel jackets, steel tape was wound round and round the inner tube. The tension under which this was coiled could be regulated to the utmost nicety, so that each layer from the inner to the outer took an equal share in resisting circumferential strain. Not only was this refinement impossible with a large mass of metal, but the danger of a forging containing a hidden flaw was avoided. Every inch of riband could be examined and tested, and its tensile strength was double that of a forging. This method of construction was eventually employed for every size, down to and including the field gun. With it a lighter piece would do the same work. The sole disadvantage

was that the wire provided no longitudinal strength and no girder effect. The largest sorts were apt to droop at the muzzle. The immense pressures developed in these modern monsters with cordite caused such intense heat as to melt the metal, and they very quickly lost accuracy. When this occurred they were lined with a new inner tube.

With the breech-loader both ends of the vent could be got at so that renewal was simple ; but, especially with cordite, vent erosion would have been very serious had the gas been able to escape to the rear past an ill-fitting friction tube. A vent-sealing tube was therefore adopted, similar to the solid-drawn small-arm cartridge, filled with powder composition and with a percussion cap in its head which was struck by a hammer. This effectually sealed the aperture and prevented any escape of flaming gas. Alternatively the gun could be fired electrically. The same sort of tube was used but fitted with two wires separated by a small gap. A high-tension current passed through this circuit bridged the gap with a spark, firing the powder in the tube. The principle in fact was that of the sparking plug of a motor-car engine. This enabled the gun to be fired by an observer at a distance.

The quick-firing gun was the next to appear, called Q.F. to distinguish it from the B.L. This developed out of the early naval machine gun with a 1-inch calibre, employed against torpedo-boat raids. Though these weapons were none of them satisfactory, they demonstrated the advantage of fixed ammunition with the charge in a metal cartridge case containing its own means of ignition, trigger fire, and automatic ejection, where, as in this case, speed of fire was the vital factor.

Single-barrel 3- and 6-pounders embodying these features were mounted to guard against raids and defend minefields. The mounting at first was nothing more than a fixed pedestal about which the gun was free to swivel in any direction. One man kept it laid on the target by means of a shoulder-piece with a rubber pad and pulled the trigger, the other loaded the fixed ammuni-

tion. The breech-block was of the wedge type worked by a single-motion lever, cartridge ejection being automatic.

This rigid mount involved a great strain, so the next step was to provide a cradle with a small buffer on either side to absorb the shock of recoil, a coiled spring inside the buffer casing assisting the work and bringing the gun back to the firing position.

Next came the 12-pounder Q.F. to cope with the more powerful torpedo-boat destroyer. This had a breech-block of the interrupted screw type, but differing from that of the B.L. gun. No escape of gas could occur with a brass cartridge and the pad of asbestos and fat was dispensed with. The rear portion of the block was cylindrical but the front portion was coned, giving the requisite clearance to enable it to be swung straight into a breech of similar form, the breech being opened and closed by one motion of a lever. The thread was so interrupted that the screwed portions on the cylinder were in rear of plain portions on the cone and vice versa ; the object being to equalize the distribution of the bearing surface.

Another advantage of having the charge in a brass case was that there was no need to clean out the chamber after each round ; any residue remained in the cartridge case. The Q.F. principle with a breech-block of the above type was adopted to some extent for larger guns though, for the 6-inch and above, shell and cartridge were loaded separately. The 100-lb. projectile of a 6-inch gun was as much as one man could lift and it would have been dangerous to store the two together in a magazine. Until cordite came into use, however, increased rapidity of fire was of small advantage for the larger natures, for the gun could not fire again till the cloud of smoke had passed away. The B.L. gun was the one mainly used in the land service where muzzle-loaders were gradually replaced by an odd assortment of 4-inch, 4.7-inch, 5-inch, 6-inch, 7.5-inch, 9.2-inch, 10-inch and 12-inch guns, with 9.45-inch high-angle howitzers to drop a shell on the deck of a battleship. Equally varied were the types of mounting that superseded the hydro-pneumatic, some being

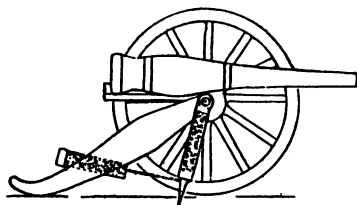
discarded naval patterns; but their essential features were the same. The lower portion traversed while the upper gave elevation and was provided with buffers and recuperator springs. The buffer by now was a more elaborate affair, with variable apertures in the piston which slowly closed as the gun was brought to rest or some other device to produce a smooth recoil.

By 1914 these varieties had been standardized. The 9.2-inch B.L. was the primary fortress armament, the 6-inch B.L. the secondary, with 12- or 6-pounder quick-firers to deal with light craft. The 6-inch centre pivot mounting had as foundation a circular pedestal bedded in concrete. Above this was a pivot round which the carriage revolved on a ring of live rollers. In trunnions on the carriage was a cradle capable of vertical motion with a buffer underneath, on either side of which was a case containing a set of springs. The gun recoiled in feathered ways above the central buffer to which it was attached at the breech. The carriage was provided with a shield in front, curved away to the rear on either side. The 9.2-inch barbette mounting was similar in general type, but here the recoil was also made to compress air, the energy of which could be stored up, as in the hydro-pneumatic mounting, and used to work the shell hoists.

In this account of modern development it has been convenient to deal with one subject, the fortress gun, first; and I now take up the tale so far as it concerns the field.

In 1893 cordite became the propellant for the field gun. Horse Artillery were given a lighter 12-pounder of 6 cwt., and the original 12-pounder of 1883 was redesigned for Field Artillery, becoming a 15-pounder. This was the first field equipment to be provided with anything more elaborate to check recoil than a brake or drag-shoe under the wheel. Suspended from the axle-tree was a spade at the end of a case containing a coiled spring. In action, the spade was lowered into the ground and attached to another cased spring housed between the plates of the trail. Powerful brakes were also provided, so that the arduous labour of running the gun up

by hand after each round was avoided. But the spade caused the carriage to be brought up short with a violent



jar, and the next step was to incorporate a top carriage or cradle in the design, containing a short buffer under the gun to partially absorb the initial shock, volute springs returning the piece to the firing position. The spade was also fitted to the 12-pounder carriage, but not the buffer arrangement, which was looked upon as too delicate for a gun that had to gallop across country. Another feature was the provision of a lever which by one motion performed all four operations of opening or closing the breech. The friction tube was retained, but it was made an exact fit and secured in the vent so as to seal the aperture.

In 1895, the first B.L. field howitzer appeared, the 5-inch which, with its lyddite shell, earned celebrity at Omdurman ; and the next year a 6-inch howitzer of 30 cwt., a siege gun. Both had buffers and recuperator springs, the piece sliding backwards and forwards in a short trunnioned cradle. With a howitzer the recoil was more gentle, the charge being smaller. The 6-inch could either be fired on its wheels, or else they were removed, the full length of the carriage and trail resting on a stout wooden platform with a plate to which the front of the carriage was anchored.

These designs being more recent, were more up-to-date than those of the 12- and 15-pounder ; and in 1899 it was decided to replace both the latter by quick-firing equipments. But the outbreak of war caught us napping and caused the change to be postponed.

The 13- and 18-pounder Q.F. equipments were eventually introduced in 1904, as soon as the war was over, and

marked a very great advance in design over their predecessors. The direction of recoil of a gun is in the line of its axis, but so long as it was fixed in trunnions, motion was restricted to the plane of the platform, in this case the ground. The result of this antagonism between the direction of effort and the resultant movement was that the wheels jumped in the air and everything was thrown out of gear. The axial spade, though it saved the toil of running up the gun, accentuated the stress by bringing everything up standing, and the buffer and springs of the 15-pounder were intended to relieve this. But the arrangement only absorbed the first initial shock of recoil. The carriage was still thrown all abroad, the crew had to stand clear while the gun fired, and it had to be entirely laid afresh after each round. In the modern fortress carriage the gun was free to recoil axially in its cradle, eliminating this strain; and the most important feature of the new field equipments was that they embodied this principle.

The 13- and 18-pounders were provided with a cradle which allowed the gun to recoil to the full extent without affecting the stability of the carriage, motion being checked by a long buffer above the gun, the case of which contained coiled recuperator springs. The carriage became a steady platform, held in the ground by a spade at the end of the trail, at which the crew could work behind the protection of a shield. The breech-block was of the coned interrupted screw type, manipulated by a single-motion lever, the gun was fired by trigger and the brass cartridge case automatically ejected. Fixed ammunition was not only a factor that further increased the rate of fire; it very materially simplified ammunition supply in the field to have the means of ignition, charge, shell and fuze in one complete unit.

Next followed the 4.5-inch howitzer on similar principles, with a wedge breech-mechanism, and means of rapidly bringing the piece into a horizontal position for loading. But here the shell and cartridge were separate as the charge was variable.

At the same time certain heavy batteries were formed,

armed with a 60-pounder B.L. gun, following what was now the standard type of design. For this there were three successive means of transporting the gun. In the first it was permanently in the firing position, and the weight on the gun wheels proved excessive ; in the next the gun with its cradle could be shifted to a travelling position intermediate between the gun and limber wheels ; and in the last the cradle was stationary, the gun alone being moved.

The movable armament we were capable of putting into the field in 1914 consisted of the above, the 6-inch B.L. howitzer, some Territorial batteries equipped with the old 15-pounder converted into a quick-firer, others with the 5-inch howitzer, and others with 4.7-inch Q.F. guns on travelling carriages.

Passing to mountain batteries, prior to 1879 the mountain gun was a 7-pounder, but in that year a jointed 10-pounder appeared, the two parts being screwed together by a trunnion ring. This was succeeded by a jointed breech-loader in 1896. These equipments took to pieces so that each part might form a load for a mule, and their use was practically confined to India.

This summary has been necessarily restricted to the main outstanding features. Changes were incalculably greater in fifty years than in the whole previous five hundred of the life of the gun, and it would be manifestly impossible to trace them in detail. Nor can any attempt be made to describe the innumerable new adjuncts of the gun : range-finders, automatic and telescopic sights, means of indirect laying or observation, etc. Their name is legion and for the student whole libraries exist dealing with artillery matériel.

It would be equally out of the question to record alterations affecting other types of military stores. The equipment provided for the soldier's comfort in barrack, camp and hospital markedly improved, both in quantity and quality. One item that may perhaps be selected for special mention is the waterproof sheet, first served out by the Board of Ordnance at the Crimea

to the gunners and sappers, and later provided for every man in camp or on service. Before then the soldier had no protection on the battlefield beyond a wretchedly thin greatcoat or an equally wretched blanket. This sheet, being provided with eyelets, could be stretched on the ground or made into a bivouac by lacing two together. It was also often worn over the shoulders as a protection from rain.

Some few items were simplified, notably in the case of horse transport. A number of cumbersome farm carts and wagons were replaced by light general service and limbered wagons, and a miscellaneous collection of heavy shaft-draught harness with neck collars by a simple universal type of pole draught, with quick-releasable wire traces and breast-pads in place of collars. The saddle too, little by little, was improved almost out of recognition. But on the other hand new sorts of specialized transport appeared, for example the travelling kitchen and bicycle.

Indeed, for every item standardized, there were scores that became more complex and hundreds that were entirely novel; besides which there came into existence an immense range of tools, appliances and materials to enable repairs to be effected and components replaced. Of all this it is obviously impossible to give any account, as a glance at a modern vocabulary of stores or the lists of changes in war matériel published each month will show.

In a previous chapter mention has been made of the influence of the industrial revolution on British policy towards army administration. Almost infinitely greater, in the long run, has been the effect of that world movement on methods of warfare. The replacement of hand labour by machinery and the application of science to manufacture rendered possible the production, not only of weapons of precision, but of a host of new forms of equipment. In consequence conceptions of strategy and tactics have been, and are still, in process of revision. Upon no branch of the army has this military-mechanical revolution, as it may be called, had more effect than on

the Ordnance, and thus this chapter may fittingly conclude with a survey of the incidence of the development on Ordnance services.

Artillery matériel had always been the special care of the Ordnance, and by the time the gun with its mounting became such an exact and intricate piece of machinery, the Corps possessed a mechanical engineering branch to keep it in repair, and a specially trained staff to examine ammunition and carry out laboratory operations. Its armourers too became highly skilled mechanics, capable of dealing with the elaborate mechanism of the modern rifle and machine gun.

But before then the Ordnance were but storekeepers. The Royal Engineers formed the scientific body of the army, and to them was entrusted the development of every new discovery unless connected with arms—for instance mechanical transport by rail and road, the telegraph and telephone, hydraulics, steam and electric power, aeronautics and submarine mining. The R.E. were not only the manipulators of every such new equipment, but also, especially while in the experimental stage, its providers and repairers.

The essential function of the Engineer was to deal with field works and fortifications and, as an inheritance from the Board of Ordnance, he was saddled as well with the construction and maintenance of barracks, the care of War Department lands and Government surveys. This seems a wide enough profession for any man to master, and when the Corps of Royal Engineers became saddled with various new functions in addition, its activities became so diverse that, to put the matter vulgarly, it had to bite off more than it could chew. Thus gradually, and one by one, duties connected with these novel services were specialized and undertaken by others, the development varying and tending to follow what was at the time the line of least resistance.

For instance, general survey work and map making became a separate Government department under the Board of Agriculture, the old title of Ordnance Survey being retained. Its place was taken by military

topography, a subject which every officer had to study, and one for which the equipment was provided by the Ordnance.

Indeed, as new types of equipment became standardized the first step was usually to make the Ordnance responsible for their provision and supply. Submarine mines and cables were so dealt with by the time when this form of harbour defence was taken over from the R.E. by the navy at the end of the century. Telegraphic and telephonic apparatus, together with appliances for visual signalling, were standardized and supplied by the Ordnance; and early in this century a Corps of Signals was formed which relieved the R.E. of the work of operating all communication services not conducted regimentally. By then the Ordnance was equipped with a staff of electricians capable of repairing the delicate instruments employed. Light military railways were mainly used in the Egyptian and Soudan campaigns. They were in the nature of field works—constructed and operated by the R.E. The few items of rolling-stock and platelayers' tools, however, which were standardized found their way into the Ordnance vocabulary; and the Ordnance held the reserve of railway plant kept at Woolwich. It also provided such miscellaneous engineering equipments as those for mining, bridging, pumping, water supply and search-lights.

The heavy steam traction engine was little used and remained with the R.E. But when the internal combustion engine was adopted for road transport at the beginning of this century, the lorry and motor-car rapidly became important links in the chain of supply of an army in the field, and their development was entrusted to the Army Service Corps. There was this difference, however. Horsed-transport vehicles and harness were furnished and repaired by the Ordnance, whereas everything connected with this new service was in the hands of the Army Service Corps. This was only natural while matters were in an experimental stage; but a couple of years before the Great War, when some sort of standardization was being reached, a process of division

of labour set in. This time it took a new form. Provision and storekeeping were to remain with the A.S.C., while the Ordnance, by then recognized as the mechanical engineering branch of the army, was to be responsible for repairs. This was a thoroughly bad line of demarcation, and the plan broke down promptly under the test of the Great War.

The balloon was another side line that remained with the R.E. But as soon as the aeroplane appeared, the last new equipment introduced prior to 1914, a Flying Corps was formed. The Ordnance never had any dealings with aircraft beyond at first taking over unserviceable materials at Aldershot.

The whole tendency then was for the work of the Ordnance to develop on technical lines. While it supplied the army with everything from tin-tacks to tampions, from boots to binoculars, it was principally occupied with the scientific side of warfare, having to test ammunition and explosives and look after an ever-increasing range of highly intricate apparatus—mechanical, electrical and optical. At the time of the Crimea, Ordnance depots possessed at most a few carpenters and coopers, sailmakers and smiths. By 1914 they had laboratories and workshops equipped with a variety of modern appliances and a staff capable of mending gun-buffers, range-finders, or telephones. The units of an army in the field were restricted by reasons of mobility from carrying anything but a few hand tools, and anything beyond simple first-aid repairs was a matter for the Ordnance to undertake.

CHAPTER XV

THE ROYAL ARMY ORDNANCE CORPS

AS a definite military unit, with enlisted privates and officers who receive their commissions from the Sovereign, subject to martial law and military discipline, and with the obligation of wearing uniform, the Royal Army Ordnance Corps did not exist until after the Crimean War.

But such hard and fast distinctions between soldier and civilian are modern ideas. There have been disputes in quite recent years as to who is entitled to the rights of a combatant if captured by the enemy, notably in the case of the franc-tireurs of the Franco-German war; and in South Africa the Boers certainly did not fulfil all the qualifications supposed to be essential. In fact the jurists who assembled from time to time to consider this matter at the Hague never succeeded in arriving at a definition for a soldier acceptable to every Great Power.

The earliest record that exists of an Attiliator, the forerunner of the Master of Ordnance, describes him as a military-implement maker; and at that time, it might be said, our army consisted of a permanent nucleus of Ordnance personnel to tend military engines and weapons, to which were joined, in time of war, bodies of amateur soldiers who afterwards resumed their ordinary vocations. Thus in a wide sense, as heirs to the master-bowyers, master-fletchers, master-carpenters and master-smiths who, in mediæval days, were responsible as Officers of the Ordnance for the care and provision of warlike matériel, and to their successors the storekeepers, clerks, artificers, armourers and storemen of the Board of Ordnance, the R.A.O.C. can claim a far longer continuous history and more ancient lineage than any other unit of the British army.

It was only during the lapse of centuries that the staff of the Master of Ordnance sifted gradually into two elements. The one, which worked the guns, became the

more military in type ; the other, which found them, kept them in working order and saw that there was a sufficiency of ammunition and other essentials, less so. But it was merely a matter of degree. The storekeeper, storeman, or artificer of the Board of Ordnance received his commission or patent of office from the Master General, just as did the officer, gunner, or sapper ; and neither had an entirely military character as we now know it until after the Crimea.

The most obvious way in which the soldier is now distinguished from the civilian is by his uniform. But there was no striking difference between their style of dress until about the middle of the eighteenth century, and it is not improbable that the higher permanent civil officials of the Board of Ordnance then continued to wear what became the military habit, if only that their authority should be recognized. The reader of *Vanity Fair* will recollect how Jos. Sedley in Waterloo days sported a gold-laced foraging cap, braided frock coat, white duck trousers, and moustaches (worn only in the army), so that folk mistook him for a great personage, such as a Commissary General or Government Courier. He shaved his lip before bolting from Brussels in a hurry on that memorable Sunday of Waterloo, so as not to be taken for a soldier.

It is only, however, after Waterloo that any definite instructions on the subject appear. For the purpose of allotting quarters, the Storekeeper was then ordered to rank as lieutenant colonel, the Deputy as major or captain—according to whether or no he had an independent charge, the Assistant as lieutenant, and the Clerk not holding a Treasury appointment as a non-commissioned officer. This was superseded by a Horse Guards letter of 1826 in which the Commander-in-Chief, with the concurrence of Wellington, the Master General, directs that, to ensure proper co-operation of the military and civil abroad, the comparative ranks of Storekeepers and Barrackmasters are to be fixed relatively to the army as follows : Storekeepers and Barrack-

masters 1st Class with 15/- pay as majors, Deputy Storekeepers and Barrackmasters with pay from 10/- to 15/- as captains, Clerks of stores acting as Deputy Storekeepers and all Clerks on the regular establishment as subalterns.

Next followed in 1833 an exact description of the uniform to be worn. This consisted of a single-breasted blue coat with red stand-up collar and cuffs, buttons bearing the Ordnance arms, and gold epaulettes according to rank mounted on scarlet cloth; blue cloth trousers with a gold lace stripe $1\frac{3}{4}$ inches wide, or white linen trousers in summer; a cocked hat with gold lace and cockade, a black silk stock and white gloves. The sword was given a gilt half-basket hilt bearing the King's cypher, the scabbard of black leather had gold mountings, the black leather waistbelt, provided with sword slings, being worn under the coat. The cloak was blue lined with scarlet. Altogether a handsome outfit, following the custom of the times. The same costume was worn in undress except for the gold epaulettes and trouser stripe. The established Clerks had a similar uniform, but without epaulettes or shoulder straps. In the following year this uniform was ordered to be worn by Ordnance Barrackmasters at home as well, and Barrack sergeants were to provide themselves with a double-breasted blue greatcoat with red turn-down collar and Ordnance buttons, blue waistcoat and trousers, a round hat and cockade.

Except that volunteer corps were formed during the Napoleonic Wars from the civil establishments of the Board of Ordnance (when there was a glut of applicants), this is as far as militarization went until the Crimea when, for the first time, an Ordnance Storekeeper was appointed at the seat of war to take charge of all stores for every branch of the army. Following the abolition of the Board of Ordnance, this process was extended elsewhere and in 1857 the Board's civil officers were amalgamated into one body under the title of Military Store Officers, the gradings being Principal Military Storekeeper and Military Storekeeper, both ranking as

lieutenant colonel, Deputy Military Storekeeper as major, and Assistant as captain. They now moved from place to place as casualties occurred and became liable for duty on active service.

The next step was when, under two Royal Warrants of 23rd April and 12th June, 1861, the Military Store Department was reorganized with a view to increasing its efficiency and improving the position of the officers, who were granted commissions under the Royal Sign Manual. Five grades were established: Principal Superintendent of Stores, Superintendent, Deputy, Assistant, and Deputy Assistant of Stores; ranking respectively as colonel, lieutenant-colonel, major, captain and lieutenant. Personal merit was to be the primary ground for promotion, though due weight was to be given to long and faithful service. A roster of foreign service was adopted. The age of future entrants was to be as a rule from 18 to 23 after passing a civil service examination in English composition, Latin, French or German, the elements of history, geography, handwriting, arithmetic, algebra to compound equations and the first six books of Euclid. Alternately candidates might be officers of the army who had been to Sandhurst, if under twenty-five. All were to undergo nine months' instruction at the Ordnance Factories.

The officers were expected by "sedulous attention in the discharge of their duties, to acquire a full and practical knowledge, not only of the various descriptions and proportions of military stores and munitions of war required for the several services, but also of the nature and qualities of the materials of which such stores and munitions are composed. It is only by these means that an efficient and intelligent body of officers can be formed." They were to make themselves thoroughly conversant with all changes of pattern, and their future advancement was much to depend on the extent and accuracy of their knowledge of such matters. To test this each officer was to keep a "Note and Remarks" book which the Director of Stores at the War Office was to examine

yearly. Finally, relying on their zeal and integrity, the Queen was pleased to dispense with the security bonds hitherto furnished in the case of officers who accepted commissions under the new scheme.

To relieve the officers of mere clerical work, give them time to study their profession and as a boon to deserving non-commissioned officers of the army, a subordinate class of clerks was created. These were selected from pensioners as a reward for steadiness of character and good conduct while serving in the ranks, and were divided into classes. The first class ranked as sergeant major with $4/6$ a day pay, the second and third as sergeants with $4/-$ and $3/6$. These pensioner clerks were to be between 45 and 60 years of age, to have a good, clear handwriting, a knowledge of arithmetic, including fractions, and to be capable of writing from dictation, or composing an original letter with ease and correctness ; a very far cry from the modern 1st class certificate of education. The clerks were to be reported on confidentially every year.

Details of the uniform were published the next year. The officer's tunic was blue edged with scarlet cloth, with scarlet collar and cuffs, a slash on the sleeve, and gold lace appropriate to rank of staff pattern $\frac{1}{2}$ inch wide. A blue shell jacket with scarlet facings was worn abroad in undress. Buttons were gilt with a raised crown and the words Military Store Staff. A cocked hat with gold lace, loop and tassel and with black and white cocktail feathers was worn in full dress, and a forage cap having a gold netted knob and peak embroidered according to rank in undress. Trousers were of blue cloth with a stripe $1\frac{1}{2}$ inches wide of gold lace for full dress and of scarlet for undress. But for grades below Superintendent the scarlet undress stripe was replaced by two scarlet welts. The cloak and sword were as for infantry and the sword belt was of black morocco leather, with gold embroidery for those ranking as field officer. A frock coat and waistcoat served as an intermediary between full and undress as in other branches of the service. Wellington boots, and brass spurs screwed into

the heel for senior officers, completed the uniform. The tunic of the Military Store Clerks was similar only plainer. The shoulder straps bore the letters M.S. with the addition of a crown for 1st class and a star for 2nd class. Blue trousers having two stripes of scarlet piping were worn over Wellington boots. The forage cap was blue, with black leather peak and chin strap, a band of scarlet with M.S. embroidered in gold and a black-netted button. This established the uniform at what it remained ever afterwards subject to vicissitudes, blue with red facings and a double red stripe down the trouser.

In our expeditions to China and New Zealand of 1860, sergeants were appointed from the artillery and other regiments as conductors under the Military Store Officer, the rest of whose staff consisted of civilian artificers and labourers. But these conductors, hastily despatched, were untrained and without experience of new types of war-like stores. It was therefore decided in 1862 to post a quartermaster and five sergeants of the Artillery with two sergeants of the Engineers to Woolwich, and two infantry sergeants to the Tower and Pimlico, to learn the work. They were to be supernumerary to establishments and relieved after three to five years so that a skilled military nucleus staff of subordinates might be built up ready for the emergencies of war. The infantry conductors were given blue tunics in 1863.

It will be seen that the Ordnance war organization was still very much of a patchwork. It had its own officers, the clerks were army pensioners, the conductors drawn from the army at large and the rest civilians supplemented by military labour.

What is now the Royal Army Ordnance Corps was not actually formed until 1865, when the following Royal Warrant was published in the month of November :

Whereas it has been represented to us by our Secretary of State for War that the efficiency of the Military Store Department attached to Our Forces would be greatly

increased by the organization of a Corps for permanent duty in that Department, trained and instructed in the duties which would devolve upon them, either when attached to Our Army in the field or employed in Our Arsenals and Storehouses, Our will and pleasure is, That a Corps be forthwith raised for this purpose, which shall be called the Military Store Staff Corps, and shall be for general service at home and abroad. The various ranks and rates of pay shall be governed by this Our Royal Warrant.

The Corps was to be administered by the Director of Stores at the War Office and the ranks were to be filled by volunteers from the army or by direct recruiting. Headquarters were at Woolwich and the Corps was commanded by officers of the Military Store Department, one of whom was to act as staff officer and, with certain quartermasters appointed thereto, deal with regimental matters. The rates of pay for the different ranks of the Corps at its birth were as follows : Sergeant Major 5/-, Colour Sergeant 3/2, Sergeant 2/4, Corporal 1/7½, 2/Corporal 1/6, Private or Bugler 1/3.

There was also working pay varying from 6d. to 1/6, according to skill, and extra pay was allowable to men selected for special positions of trust either as clerks or storeholders. Enlistment was for ten years' service with the option of re-engaging up to twenty-one.

The tunic was blue with scarlet facings, edged with scarlet piping and decorated with yellow lace ; the shoulder straps bearing the initials M.S.S.C. embroidered in yellow. Trousers were blue with a double scarlet stripe ; and the chaco, of the same colour, had a plate with the initials M.S.S.C. For undress there was a plain serge frock with scarlet lace and a round forage cap 2½ inches high with a ¾-inch yellow band and a button of scarlet lace. Staff sergeants and higher ranks had a peaked cap.

The original establishment of the Corps was 200

men, all of whom are shown in army distribution lists for 1866 as at Woolwich. In each of the next two years the strength was increased by 100, and by 1869 the distribution was as follows : Woolwich 274, London 59, Portsmouth 16, Devonport 16, Aldershot 13, Dublin 13, Chatham 10, Edinburgh 1, St. Helena 1, Windward and Leeward Islands 1.

In the following year the Control Department was set up, which for the time being did so much to mar the development and individuality of the Corps. It was now that the officers were first divided into a senior branch with administrative, and a junior with executive duties. Now also the title of Commissary appeared for officers of the department. Although there had been Commissaries of Ordnance in bygone days the term was only used in connection with the improvised Field Train. It belonged really to Commissariat phraseology and had not been employed in the regular storekeeping establishment of the Board of Ordnance.

Under the Control Warrant of December 3rd, 1869, the administrative officers were to be selected from those of the Commissariat, Military Store, Transport, Barrack and Purveyor's Departments, and the army generally ; fresh appointments being filled by combatant officers or by promoting executive officers. They were graded as Controller, Deputy Controller and Assistant Controller, ranking equivalently to major general, colonel and lieutenant colonel.

The executive branch was to be formed from officers or others recommended by the Secretary of State for War, after passing an examination. Subalterns of two years' service might transfer and non-commissioned officers under thirty. The grades in this branch were Commissary, Deputy Commissary and Assistant Commissary, ranking as major, captain and lieutenant.

But the conditions of service and pay did not attract army officers. Except for a few who were posted to some of the higher administrative posts (some of whom had been at the Staff College), the Control Department was

officered by giving direct commissions to youngsters after passing a civil service examination.¹

What was appropriately christened the Army Service Corps was formed at the same time by amalgamating the military elements in these ancillary departments, and a universal uniform adopted. White was the distinctive facing colour of both the Commissariat and Transport Corps when formed after the Crimea and was adopted for the Army Service Corps. The tunic was wholly blue with white lace to outline the collar and cuffs and white piping round the edge. A.S.C. appeared on the shoulder straps and chaco plate, the band and button of the cap were white, and also the double trouser stripe. At the same time certain new badges appeared; a hammer and pincers for the artificer, a wheel for the wheeler, a bit for the saddler and a horse-shoe for the smith.

Control disappeared in 1876, the Ordnance Store Department being formed from those officers who had remained engaged on store duties.

Originally the senior Military Store Officer was merely *primus inter pares* among his brothers of the same gradation, all of whom were independently responsible to their War Office Director. Then, in 1870, the senior officer, Gordon, became Controller at Woolwich, emerging now as chief of the new department. The term Controller disappeared as a title and was replaced by that of Commissary General. Except for combatant officers appointed to higher posts, admission was to be by civil service examination, though subaltern officers under 22 were allowed to transfer.

A fresh warrant appeared in 1880 when the Commander-in-Chief was about to become responsible for the discipline of the Department and Corps, and henceforth officers were recruited solely from the army. For the administrative side there was a Commissary General

¹ The first batch of these "young gentlemen" in 1872 was called, on account of its number, the forty thieves, and the first of this batch was Colonel Markwick, C.B., O.B.E., R.A.O.C., who served as a "dug-out" throughout the Great War.

of Ordnance at Woolwich ranking as major general, with Deputy or Assistant Commissary Generals elsewhere. The executive side was to be recruited from warrant officers of the army and the title of quartermaster—with the ranks of major, captain, or lieutenant—superseded that of Commissary; the reason being that it was a well-understood appointment, one looked forward to by those seeking commissions, and because it was undesirable to multiply grades. Officers on the administrative side were either to have passed the Staff College or some other unspecified educational test; but in practice nothing of the kind seems ever to have been insisted on. There was still little competition to join.

But though the officers of the two departments separated in 1876, the rank and file remained as the Army Service Corps for five years longer. In 1877 it was ordered that the documents of the companies engaged on store work were to be sent to the Ordnance Store branch of the A.S.C. at Woolwich, and in 1880 the A.S.C. was divided into a Commissariat and Transport, and an Ordnance branch. In 1881 the former services were transferred to the Commander-in-Chief, while those engaged on the latter came under his jurisdiction for discipline only. This led to the complete separation. A Royal Warrant abolished the designation Army Service Corps, replacing it by two distinct units, the Commissariat and Transport Corps and the Ordnance Store Corps.

These changes were reflected in the uniform. In 1880 the Ordnance branch of the A.S.C. was once more given a double red trouser stripe, with red and yellow lace mingled round the collar and cuffs. A crown was worn on the shoulder, the initials O.A.S.C. on the shoulder and O.B. (Ordnance branch) was added to A.S.C. on the chaco plate. A yellow, or rather buff, band was placed half-way up the blue forage cap with a red line down its centre and a similar button on top. In 1881, when the Ordnance Store Corps finally separated from the Commissariat and Transport (to-day once

more the A.S.C.), the red and yellow lace disappeared, and scarlet facings with piping round the edge of the tunic were re-introduced, together with the initials O.S.C. The crown continued to be worn and also the forage cap adopted the year before; and it was owing to its red and yellow band that the Corps got the nickname of the "barley sugar brigade."

After this, changes in uniform were infrequent and may conveniently be disposed of here. At that time the universal blue helmet was replacing the chaco and this change naturally applied to the Corps. The field service cap of the 'nineties was blue edged with scarlet braid, the forage cap described above remaining in use as well until the Brodrick cap replaced both. This also was blue with scarlet trimming. The blue peaked cap that replaced the Brodrick had three scarlet welts round it. The initials A.O.C. appeared in place of O.S.C. in 1896, and at the same time the old arms of the Board of Ordnance—less the hand grasping a thunderbolt, motto and supporters—became the cap and collar badge instead of a crown. The sole change in the tunic occurred in 1907 when the collar was squared in front, the buttons in front were reduced from nine to seven, the scarlet edging was removed and a blue cloth slash with red piping and six buttons replaced two perpendicular lines of piping on the back of the skirt. Service dress of course came into use at the same time as for the rest of the army. For arms and equipment development followed as for the infantry, except that old patterns remained in use longer in all departmental Corps.

I now return to the subject of organization. The Military Store Staff Corps entered the Army Service Corps 400 strong. It never really amalgamated with the Commissariat and Transport section and was of approximately the same strength in 1877, in four companies styled A, B, C and L. All four had their headquarters at Woolwich, with detachments scattered about the United Kingdom but none abroad. In this year B Company sailed for Natal to take part in the Zulu War. Otherwise it was not till 1880 that any material change

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occurred. The strength of the Corps was then increased to 500, which was to be followed by further rapid development. In 1881 B Company returned from Natal, L Company was re-christened D, the establishment rose to 600, and detachments were posted to various foreign stations, distribution being as follows :—

Woolwich	217	Cork district	10
Northern district	14	Gibraltar	22
Eastern „	5	Malta	6
S. Eastern „	5	Cyprus	7
Chatham „	5	Cape of Good Hope	2
Home „	2	St. Helena	2
Aldershot „	34	Natal (before B Coy.	
Southern „	24	returned)	118
Western „	19	Mauritius	2
North British „	10	Straits Settlements	2
Jersey „	1	Canada	6
Belfast „	1	Bermuda	25
Dublin „	54		

In the following year C Company went on service to Egypt, returning in 1888, and in 1890 A Company was posted to Aldershot. In 1885 the establishment was 681, 751 in 1888, and 857 in 1892—a striking contrast to the stagnation of the 'seventies when the Ordnance formed part of the A.S.C. The increment of 1892 was effected by creating a fresh Company E.

A new war organization appeared in 1893. Arrangements for mobilization were looming large in the eyes of the War Office and these large companies were ill-adapted for the purpose. Aldershot alone absorbed a complete company, elsewhere there existed only detachments furnished from Woolwich. It was an unsatisfactory and lengthy process to create the staff needed for an expeditionary force from these widely dispersed fractions, strangers to each other. For purposes of war therefore the five Companies were re-formed into ten, each 50 strong, called on service Depot Units. A Company

furnished No. 1 and 2 and so on, the distribution being :

Nos. 1, 2 and 3	Aldershot
No. 4	Woolwich
No. 5	Dublin
No. 6	Haulbowline
No. 7	Egypt
No. 8	Gibraltar
No. 9	York
No. 10	Devonport

The depot at Woolwich, which provided detachments elsewhere at home and abroad, accounted for a further 350, the constitution being as follows :—

Warrant officers	60
Staff sergeants and sergeants	132
Rank and file	660
Buglers	5
Total	<hr/> 857

In 1895 No. 1 was employed on the West Coast campaign, returning to Aldershot the next year.

The year 1894 marks a very important milestone, when Ordnance services undertook a whole new range of duties destined to increase immensely in importance. The title Ordnance Store Corps disappeared and the Army Ordnance Corps, which sprang from its ashes, absorbed the Corps of Armourers and the Armament Artificers. At the same time the Inspectors of Ordnance Machinery were transferred from the Artillery to the Army Ordnance Department of officers (newly so styled), forming, with the artificers, what is now the mechanical engineering branch of the R.A.O.C.

The genesis of armourers as an organized body in the year 1843 has been traced in Vol. I, p. 192. After the Crimea they were formed into a Corps administered by officers of the Enfield Small Arms Factory.¹ In 1887,

¹ The actual date of formation I have failed to discover. But there is mention of a Corps of regimental armourers in a collection of Royal Warrants and Memoranda of the year 1860 at the War Office Library.

when inspection and manufacture were separated, the armourers came under the Chief Inspector of Small Arms. They first appear as a unit in army distribution lists of the year 1889, with a strength of 272 and headquarters at Birmingham. If attached to a regiment they wore its uniform, otherwise the ordinary line dress with white facings and a hammer and tongs as badge.

The origin of Inspectors of Ordnance Machinery (now styled Ordnance Mechanical Engineers) and of Armament Artificers has also been sketched on page 50 of this volume. There were at first three of the former, at Malta and Gibraltar, which had hundred-ton guns, and at Dover where two guns of eighty-one tons were mounted in a turret. Armament artificers first appear in 1882 as the Corps of Ordnance Artificers with an establishment of one warrant officer and 49 sergeants. But eleven men only were raised during the next year. They were highly skilled and were assisted by certain enlisted artillerymen who, after a course of instruction at the Artillery College, were designated machinery gunners or smith gunners according to whether they specialized at the bench or the forge. Although engaged solely on artillery work, they formed part of the Ordnance Store Corps and wore its uniform with the hammer and tongs badge and O.A. on the shoulder—initials facetiously held to stand for 'Orse Artillery. The number increased rapidly and in 1892 they were absorbed in the artillery, the strength then being 65 at home and 38 in the colonies. The gunner uniform was then adopted.

Armourers joined the Corps in 1894 and armament artificers re-entered it the next year, the establishment becoming store section 857, armament artificer section 142, armourer section 312; total 1311. With this reorganization officers' titles were changed. At the head was the Principal Ordnance Officer with administrative officers below him in four classes holding the ranks of colonel, lieutenant colonel, major and captain. But while the title Commissary General was now abolished, for no apparent rhyme or reason that of Commissary was re-introduced for officers of the executive branch,

who were styled Commissary, Deputy Commissary, Assistant, or Deputy Assistant Commissary with the ranks of lieutenant colonel, major, captain and lieutenant respectively.

In 1897/8 extra artificers and armourers were sanctioned, and in the latter year No. 11 Company was raised to relieve No. 1, which moved from Aldershot to Egypt. This brought the establishment up to over 1400.

The next event of importance was the South African War. In 1899 Nos. 1, 2, 3, 5 and 9 Companies sailed for Cape Town, and Nos. 4 and 11 for Natal, where they were soon after joined by Nos. 6 and 10; the eventual distribution in South Africa being as follows :—

No. 1. Cape Town	No. 6. Bloemfontein
No. 2. Kimberley	No. 9. Pretoria
No. 3. Port Elizabeth	No. 10. Standerton
No. 4. Newcastle	No. 11. Pietermaritzburg
No. 5. East London.	

In 1900 eight new companies were formed to relieve them, and a further four in 1902. These were located as under :—

No. 12. Aldershot	No. 18. Dover
No. 13. Aldershot	No. 19. Aldershot
No. 14. Curragh	No. 20. Hong Kong
No. 15. Dublin	No. 21. Malta
No. 16. York	No. 22. Salisbury Plain
No. 17. Devonport	No. 23. Haulbowline

There were in addition the depot staff at Woolwich and detachments elsewhere, while recruiting was allowed in excess of establishments to meet the waste of war. Some of these companies were far in excess of establishment. No. 6 for instance had a strength of 238 in 1900, so that the Corps totalled 2155 in 1902 made up as follows :—store section 1575, armourers 352, armament artificers 228.

The fat years of war, when money was granted without stint for military purposes, were followed by several very

lean years when every effort was made to reduce the cost of the army. Notwithstanding this, the new peace establishment of the Corps was actually much the same as its highest war figure.

The campaign had shown conclusively that the A.O.C. was starved for personnel and in 1904 it was committed to the care of the Quartermaster General at the War Office in accordance with the recommendations of the famous Esher Committee. There it had its own chief as Director of Equipment and Ordnance Stores to attend to its interests in the person of a very able officer, Major General (afterwards Sir Francis) Mulcahy.

Such by now were the activities of the Corps that, although the inflated war companies were reduced by the disbandment of reservists, their number was only lessened by one (No. 20 at Hong Kong, replaced by a detachment), and their establishment was fixed at 69 in place of 50, besides which two officers were posted to each.

The newly acquired Colonies absorbed a considerable number. The more intricate mechanism of the quick-firing field gun made it necessary to attach armament artificers to horse and field brigades as well as coastal artillery, and India made increasing calls on their services. Armament artificers first appear in Indian establishments in 1901 to the number of 24; and by 1909 the figure was three times as great. There were also more armourers to overhaul militia and volunteer arms, a service previously carried out by the civilian staff of Enfield. Thus, notwithstanding we were at peace, the strength continued to rise, reaching its maximum in 1907 with 237 officers, 140 warrant officers, 898 sergeants, 1338 other ranks—a total of 2613. After that no substantial change took place.

The figures previously quoted exclude officers, but after allowing for this it will be seen that in 27 years, from 1880 to 1907, the Corps multiplied six-fold. This immense increase indicates the extent to which its functions enlarged, for it was certainly not overstaffed.

The last reorganization occurred in 1912, hastened by

the Agadir crisis, and was due to the perfecting of plans for sending an Expeditionary Force to the Continent, a very different matter from our colonial campaigns of the past. This involved the concentration of a large force across the Channel at the shortest possible notice. Speed was vital, and among the earliest troops to embark must be a large number of the Corps. For this purpose it was useless to station companies abroad. Moreover, with a definite commitment that involved almost all our regular troops at home, substantial bodies of men were bound to be wanted, each with a staff capable of dealing with every variety of Ordnance work and each ready to embark as a complete unit. The companies of the past included neither armament artificer nor armourer, who went on service independently as required. The Corps was now reconstituted into nine large companies. Of these eight were service companies stationed at home with the following war establishment :—

2 Officers	6 Saddlers
23 Clerks	10 Wheelers and carpenters
13 Foremen	11 Fitters
12 Assistant foremen	4 Tent-menders
57 Storemen	17 Smiths and hammermen
3 Armament artificers	4 Painters and miscellaneous
3 Armourers	2 Batmen

A total of 167 all told, to which extra officers, administrative, executive and engineering, were added according to whether companies were grouped together or isolated. No. 9 Company, with headquarters at Woolwich, was distributed among the larger foreign garrisons, while smaller ones had detachments as in the past. The Expeditionary Force being organized in six divisions, the first six service companies were allotted to the commands which found these divisions :—

- No. 1. Aldershot command
- No. 2. Southern command
- No. 3. Irish command
- No. 4. Aldershot command
- No. 5. Western, Northern and Scottish command
- No. 6. Western command

Nos. 7 and 8 belonged to the Eastern command and were only in the form of cadres at Woolwich. This arrangement provided a cut-and-dried mobilization scheme, in so far as the economies of peace would fit in with the exigencies of war. There was a service company per division, with two extra capable of rapid creation to act as first reinforcements; each command having a peace establishment proportioned to its normal requirements. On the outbreak of war the service companies were to be brought up to full strength from their serving soldiers, supplemented by reservists sent from the depot, and each mobilized with the troops it was wont to serve in peace.

A point that must not be overlooked when describing the history of the R.A.O.C. is the recent growth of *esprit de corps*, that breath of life that can so intensely animate any body of men pursuing a common purpose and sharing a common tradition, and of such special value to a military corps.

There were many factors to account for the absence of this spirit during the tortuous phases through which the Corps passed in the earlier days of its existence. The old Ordnance officer had never served in a regiment, he was out of touch with the ordinary amenities of military life and with that good fellowship between all ranks which is such a special feature of the British army; and even when this ceased to be the case the Department, until reorganized at the end of the last century, offered more a harbour of refuge than a serious career. Then there was that arbitrary and illogical distinction between the Department of officers and the Corps of other ranks, which has only been abolished since the Great War. The Corps, moreover, was scattered in small fragments, without cohesion, each a self-contained and isolated unit. The daily routine entailed long working hours, leaving little scope for recreation; and sport or games, with the healthy spirit of emulation they foster, were only indulged in sporadically.

It was only in the South African campaign of 1899

that, speaking regimentally, the Corps found its feet. There were, for the first time in its history, large Ordnance concentrations in the theatre of war, while the smaller detachments were in constant touch with one another; and all were working as one body indivisible from the army and with the same common aim and effort, rather than as a harassing check over expenditure. All this served to break down the barriers separating the Corps from the army and its members from one another.

That the influence of this campaign did not die away when peace conditions were restored, but entered instead into the permanent inheritance of the Corps, was due, more than anything else, to the late Major General Sir Harold Parsons who, as Lieutenant Colonel Parsons, was appointed in 1905 to command the depot at the Red Barracks, Woolwich. Parsons, more than anyone, had identified himself with the general interest and welfare of the Corps, and laboured hard to combat its old besetting spirit of individualism. Above all, he had long cherished the desire to see the Department and Corps amalgamated and its status raised alike professionally and socially, and he saw in his appointment a means of realizing his aims.

It was an apt coincidence that, very shortly after, the memorial to those officers and men of the Ordnance who had fallen in South Africa was unveiled at Woolwich, uniting all members in a common band of sympathy. But there was no coincidence connected with Parsons' happy suggestion which led Major General Mulcahy, at that time head of the Ordnance at the War Office, to present a shield to be shot for annually by teams of officers and men at all centres, and which, for the first time, created a very keen and healthy inter-station rivalry in rifle shooting, pre-eminently a military sport. With the same object in view, Parsons initiated the annual gathering when the Corps played its sister Corps, the A.S.C., at cricket; actions that set in motion a wave of athletic proficiency that swept all ranks, and which has done so much in late years, by making the Corps

better known throughout the army, to smooth out friction in professional dealings with the troops.

What was perhaps even more important, he launched into existence the Corps *Gazette*, a venture for which he was fortunate to secure a very ably qualified Editor in the person of Lieutenant (now Major) W. J. Asser, who has held the post almost throughout the life of the periodical, except when its publication was interrupted by the Great War. The *Gazette* has a deservedly high reputation among regimental magazines, its influence has been always well exerted, and it linked together those of the A.O.C. as no other tie could have done, proving a particularly valuable asset to a Corps whose members are so scattered over the face of the globe.

The great stimulus imparted to esprit de corps by Parsons was extended by others and unquestionably added substantially to the efficiency of Ordnance services.

Since his death in harness as Colonel Commandant, in which capacity he continued his efforts to promote the well-being of the R.A.O.C., a window has been set up to the memory of Sir Harold Parsons in the Church of St. Barbara at the new headquarters at Hilsea. But the finest memorial to one who so identified himself with the Corps he loved so well lies in the prestige that now distinguishes the R.A.O.C. and the spirit of good fellowship that permeates all ranks.

In writing of their war services other regimental histories describe the particular campaigns in which they have taken part, but to do so for the Ordnance would be to compile a chronicle of every expedition since the Crimea, however puny, in which the British army has been engaged, except those undertaken by India with its own Ordnance Department. Again, regimental histories describe incidents of battle and their distinguished actions in the field, but it is rarely that those in the Ordnance have a chance of displaying conspicuous valour in the presence of the enemy, though examples have not been lacking when opportunity offered. It was the armourer sergeant of the 16th Lancers who,

according to regimental tradition, spiked the enemy guns at the Battle of Aliwal in 1846. Nor did the Storekeepers of the Board of Ordnance fail on occasions to produce distinguished soldiers. General Sir Robert Boyd, Lieutenant Governor of Gibraltar during the famous siege, is an instance. Boyd had been for many years Ordnance Storekeeper at Minorca, he was an important witness at the trial of Admiral Byng, and was afterwards granted a colonelcy in the Guards. This is said to have been on account of his gallant services in the defence of Minorca, though one cannot help suspecting that nepotism may have had some share in this rapid promotion.¹

But in general the Ordnance cannot expect to figure in the limelight. Its rôle can rather be compared to that of the sap which, by drawing sustenance unseen, enables the tree to attain vigour, displaying those features on which the eye delights to rest if all—trunk, branch, leaf, fruit and flower—be healthy. Indeed, one must go further and bear in remembrance those tap and branch roots, equally unseen, that supply the sap. Such credit as has been earned by the Corps at the seat of war must, in the first instance, be due to those compelled to remain behind in England, who are denied the satisfaction of seeing their efforts brought to fruition. It is only by their unsparing efforts that their more fortunate brethren nearer the front are able to cope with their equally arduous but more varied and interesting task. Woolwich, Pimlico and other establishments at home have a heavy responsibility in time of war. The dull monotony of their work, the lack of glamour and adventure, and small prospect of military reward, make it the more important that their rôle should not be overlooked.

Captain Gordon, the half-pay officer sent to Balaklava to be Storekeeper, and a brother of General Gordon of Khartoum, must be regarded as the first modern Ordnance officer to see active service, and he was rewarded with a C.B. He was posted to Woolwich in 1858 and

¹ According to Drinkwater it was Boyd who suggested the use of red-hot shot during the siege of Gibraltar.

became head of the Department, retiring in 1879 as Major General Sir Henry William Gordon, K.C.B. Another at the Crimea who joined the newly created Military Store Department was Mr. Tilley of the Artillery Field Train, awarded the medal and four clasps and made a Knight of the Legion of Honour. A third was Gordon's successor, Major General Young, C.B., who earned the Crimean medal and four clasps, the Knighthood of the Legion of Honour, the 3rd Class Medjidieh and Turkish medal, and the China medal 1857/60. In this Chinese expedition there were also present Lieutenant Rawsley, who assisted at the bombardment and capture of Canton 1857 (medal), and Lieutenant Clark, capture of Canton and of the Taku forts (medal and two clasps).

In the New Zealand campaign of 1860, Major General Sir D. Cameron, who was in command, reports that "no department in New Zealand was more efficient or came less into collision with other departments than the Military Store Department."

Lieutenant Ralph had charge in the operation at Quiah, West Africa, and was present at the capture and destruction of Massongha, of the stockades of Madonkla and of the fetish town of Robeah in December 1861, also taking part in the operations of the following year; mentioned in dispatches. By 1866, 32 officers had been mentioned in dispatches or received war medals.

But I do not intend to inflict on the reader the war services of every officer of the Corps, which are recorded in the official army lists for those who wish to read. These instances are merely quoted to show that from the date of its inception the new branch of the army had its full share of stirring events in various parts of the globe. Indeed in those days of slow and uncertain transport the Ordnance staff was in much closer contact with the battle-front than now.

A detachment of the Corps accompanied Sir Garnet Wolseley's expedition in the first Ashanti war of 1873. Some were present at the decisive victory of Amoaful in January of the next year, and took part in the march on

Kumassi, the residence of King Koffee which was burnt to the ground.¹

The theatre of war next changed to Natal, where the disaffection and aggressive spirit of our old ally Cetewayo portended trouble. A detachment of the Corps proceeded in 1877, under Colonel Wright, to join General Thesiger and were present at the opening actions of Gaika, Galeeka and Pokana. In the two following years they were reinforced by strong detachments of B Company. The company, then some 200 strong, was distributed at important points on the communications from Durban, the base of operations, to Ulundi. Many were present at the Battles of Ginghilovo and Kambula, which triumphantly closed the first period of the Zulu campaign. In the former, a series of charges on our camp, marked by the most desperate headlong courage, resulted in the loss of over 1000 Zulus. In the latter General Wood destroyed the flower of Cetewayo's army. Detachments were also on the scene when a few months later General Wood's flying column dealt the *coup de grâce* to Zulu resistance by the Battle and fall of Ulundi, the royal kraal.

An Ordnance party also accompanied General Clarke's flying column which was sent on Cetewayo's track, and was present when that monarch was surprised and captured in his kraal.

Soon after, Lieutenant Heron who, as a retired officer, served in France during the Great War, proceeded with the troops under Colonel Baker Russell, sent against Sikukuni, the foremost of the malcontent chiefs who had sided with the Zulus. A quantity of ammunition obtained from the Transvaal magazine, much of it a relic of the Indian Mutiny, had to be broken down to provide powder and bullets for the troops during the advance. Heron was present at the downfall of Sikukuni's stronghold, known as the fighting kopje, and when the

¹ Most of the accounts which follow are from the pen of Major Asser and appeared some years ago in the *Corps Gazette*. The account of the South African War is compiled from a narrative by Brigadier General Wrigley published in the same periodical.

chief, after making a last stand in the narrow cavern, surrendered.

Scarcely had Zululand been settled and the native disaffection quelled, when the discontent which had long been smouldering in the recently annexed Transvaal came to a head. In the unfortunate campaign which terminated at Majuba on February 27th, 1881, we find a detachment of the Ordnance at Laing's Nek and Ingogo.

In the following year opened the long drama of war in Egypt and the Soudan, on which the curtain only fell some twenty-seven years later at Omdurman. Needless to say, throughout this period the Ordnance had to play its part—and often a very laborious part.

The knot which the combined efforts of the Great Powers could not untie was cut by the sword when Sir Garnet Wolseley proceeded against Arabi Pasha, ex-Minister of War and now a declared rebel against his master, the Khedive.

In August C Company, which was about 100 strong, and was made up by drafts to over 200, was sent out under Captain Aplin with the Army Corps. They were stationed at Alexandria, Damietta and other points for the supply of stores, and a detachment was subsequently moved up to Ismailia, when that place was seized and made the new base of operations. Detachments of the Corps were present with the advance guard under General Graham at the skirmishes at Ramses and Tel-el-Mahuta, as also at the Battles of Kassassin, where the Egyptians were completely routed, and of Tel-el-Kebir, which resulted in the capture of that stronghold, the rout of the Egyptian army, and the flight of Arabi. An Ordnance party followed the troops under General Drury Lowe, who after a most fatiguing forced march of thirty-nine miles through heavy sand and under a burning tropical sun, arrived before Cairo on the evening of September 14th. Arabi, who had been hiding in his own house, came out and made a dignified though unconditional surrender, and 10,000 men followed his example. Tel-el-Kebir and the occupation of Cairo

decided the fate of the fellaheen movement, and rang down the curtain on the first act of the drama.

The second act took place in the Soudan in 1884. This district was in open rebellion under the Mahdi against the Khedive, and the wave of religious fanaticism that animated the Mahdi's followers was spreading to the rest of the Khedival dominions and taking in the neighbouring tribes. General Gordon had already left on his fateful mission to Khartoum as adviser to the British Government and the Khedive's Governor General of the Soudan. Detachments of the Corps left England at the outbreak of these troubles for Suakin which was beleaguered by the Mahdi's emissary, Osman Digna, and was in imminent peril. They took part in engagements with the Soudanese in and around that town, when the Ordnance stores were attacked and the enemy repulsed. Detachments also served in the British force at the hard-fought Battles of El Teb and Tamai, at the latter of which the superb and reckless onslaught of Fuzzy Wuzzy succeeded in breaking a British square. At the Battle of Tofrek, in the following year, the officer in command of the Ordnance detachment was killed. Detachments were also present at the Hasheen affair and several minor raids in the Suakin district.

Meanwhile the position at Khartoum was becoming more and more critical, and the tragic consummation was slowly approaching. With the departure of Lord Wolseley from Cairo on September 29th, 1884, the Soudan campaign for the relief of General Gordon may be considered to have begun. Portions of C Company joined the other forces in the expedition up the Nile and proceeded as far as Merowi. They remained at various stations on the river until the withdrawal of the troops. The fortunes of the river column under General Sir Herbert Stewart, who arrived before Khartoum a few days too late to avert the massacre or save the heroic defender of the fortress, do not fall within the purview of this sketch.

On the close of the Egyptian campaign of 1885 the headquarters of C Company were ordered home,

The unrest in the Soudan had, however, by no means ceased, and during this year the Egyptian frontier was perpetually exposed to Arab raids, in which villagers were killed, cattle looted and the telegraph destroyed. At last a close and daring attack on Suakin by Osman Digna with a force of 4000 men brought the Sirdar, General Sir Francis Grenfell, into the field. Reinforcements, among which was a detachment of the Corps, were promptly telegraphed for from home, and with these, amounting to 750, and about 4000 native troops, the Sirdar attacked and carried the Arab trenches at the point of the bayonet, inflicting very heavy losses on the Dervishes. In his dispatches, dated January 3rd, 1889, the Sirdar mentioned favourably the following non-commissioned officers of the Corps—Staff Sergeant W. Kennings, Corporal K. Loney and 2nd Corporal L. Leary.

There was now a pause in our war activities, lasting in fact until the Ashanti expedition of 1895/6. This campaign was necessitated by the persistent indulgence of King Prempeh in human sacrifices, inter-tribal wars, slave raids and other amusements dear to the heart of the savage potentate.

No. 1 Company, A.O.C. (it will be remembered that the Corps had been reorganized into 10 service companies in 1893) took part in this expedition. It was under the command of Lieutenant Colonel Leggett, A.O.D., with three other officers—Captain Sherwood, Captain Mathew and Lieutenant W. Cox, 1 warrant officer, 8 staff sergeants and sergeants (including 2 armourer sergeants) and 17 rank and file. The main body arrived at Cape Coast Castle on December 13th.

Everything had to be landed in surf boats; and stores were provided not only by the War Office but also by the Colonial Office which sent out, among other trifles, flint-lock muskets for arming native allies, and barrels of gunpowder, corals, velveteen, silk, bath-towels, etc., as presents for natives.

A base depot and minute workshop (there were but two smiths and two carpenters in the detachment) were

established at Cape Coast Castle, an intermediate depot at Mansu (35 miles inland), and an advanced depot at Prahsu (70 miles from the coast), the small inland depots being merely bush clearings. Everything was carried on the heads of Fantee men and women, the load being 70 lbs. Except for hospital equipment, light shelter tents and mosquito netting, little was issued; for no sooner did we reach the capital, Kumassi, than Prempeh surrendered and the troops were hurried out of the country, which was most unhealthy.

Among the articles "returned to store" on this occasion were the wicker hammocks in which the King and the royal wives were conveyed to the coast.

As a result of their arduous work and exposure in this bloodless campaign, in what was then such a deadly climate, the A.O.C., in proportion to their numbers, suffered more severe casualties than any other unit, four deaths actually occurring on the voyage home.

In March 1896 the conquest of Dongola, a province of the Soudan overrun by the Dervishes, was undertaken. The expedition was in the hand of Kitchener, Sirdar of Egypt, and a detachment of the A.O.C., comprising one warrant officer and five other ranks under Captain Mathew, was sent out to serve the small force of British troops dispatched to stiffen up the native Egyptian army. In this case I am fortunate enough to be able to quote from a narrative of Captain, now Major General Sir Charles M. Mathew, K.C.M.G., C.B., D.S.O., Colonel Commandant of the R.A.O.C.

We arrived (he writes) at Wady Halfa on June 7th, where we found Conductor Linington with one wheeler and one clerk. Apart from small-arm ammunition, there were considerably less than 100 tons of stores, and they were in a deplorable condition. Nearly all the tents had been lying for years at Cairo and wanted mending, the pack-saddlery was rotten, with straps that would give under the least strain, and all the camel tanks started to leak when the rust was removed. I wired at once for more tents and blankets, which Collingwood (C.O.O. Cairo) most providentially sent up at once, for almost

immediately the troops were ordered into cholera camp at Gemai, twenty miles distant. I also asked what was to be the composition of the force I was to maintain, and on what scale camp equipment would be wanted; but the only reply I got was that the composition was unknown and that I should submit a list of what camp equipment I had! Fortunately transport was to be furnished by Egypt, which was a load off my mind.

Refuse baskets were wanted for cleaning the camp as a preventative against cholera and barrels for storing water; the former we got at Wady Halfa and the latter from the A.S.C. contractor. The men cleaned the muddy Nile water by filtering it through the tied-up legs of khaki drill trousers and extra camp kettles were supplied to boil the water. The only way of disinfecting the tents of cholera patients was by laying them out exposed to the sun, but though handling these daily none of us were attacked by the disease.

While at Gemai, I was asked to test all the guncotton in the Egyptian army stores at Wady Halfa. Kitchener always insisted that the A.S.C. and A.O.C. ought to be one Corps, as in the Egyptian army; and when discussing the point with him, I was able to point to this test as an instance where the Egyptian organization had failed. Another job we carried out was the filing of the heads of the small-arm ammunition till the lead was exposed, for it was feared that the hard-pointed .303 bullet would not stop a Dervish charge.

The Sirdar himself kept a strict watch on all issues to British troops, principally, I think, owing to the limited transport facilities; and this of necessity entailed considerable reference and delay. A good deal of the Ordnance officer's time was occupied in trying to keep square his equipment accounts, which were conducted on the ordinary peace system. Those of units were not worth the paper they were written on, but fortunately sand-storms and burnt or sunk Nile boats covered a multitude of sins.

While the small British force was sitting down at Wady Halfa and Gemai, the Egyptian army had been

assembling ; and at the beginning of August, when the cholera epidemic died out, preparations were made for a move forward, everything not absolutely essential for the march being returned. Each man kept one blanket and slept in the open.

I had asked that an Ordnance officer should accompany the British troops in the advance to Dongola, urging that some representative of the Department should be on the spot to arrange for their requirements. But Kitchener would not hear of it, though he eventually allowed me to go in the capacity of galloper to the officer in command.

On September 18th the British troops finally took their place at the head of the column for the advance on Kermah, where the Dervishes were expected to make a stand. Every man carried 80 rounds of ammunition and two days' rations, while the reserve ammunition (100 rounds a man) was on the river gun-boats and one blanket per man on camels with the column. The whole force, some 15,000 strong, with the British in front, and the gun-boats on the river to the right, made a fine sight as they moved silently forward over the desert.

We arrived at Kermah at daybreak on the 19th, only to find that the Dervishes had abandoned the place and crossed over to the left bank of the Nile ; a masterly stroke which rendered our whole force powerless except the gun-boats and artillery, with whose aid a passage was eventually forced. In this engagement Armourer Sergeant Richardson was killed while working on one of the Maxim guns on the gun-boat *Tamai*.

I was now ordered to take charge of a post-boat which carried a 9-pounder gun intended for the advance on Dongola, and noticed that the shell from the 6-pounders on the gun-boats were dropping short of the Dervishes, who could be plainly seen. I therefore suggested to the Egyptian artillery officer on board that he should try and get his gun into action on the upper deck and he agreed. The first shot was excellent, bang into the brown of a large body of the enemy ; but at the second effort the gun broke loose, crashed into the cabin, and

did appalling damage to the crockery and utensils, as well as staving in the side of the cabin. It was only when a thirsty war correspondent came on board for a drink, and I split the last bottle of ginger-beer with him, that I realized that I was on Kitchener's own private boat !

This engagement completed the recapture of the province of Dongola ; and, after clearing our stores out of Wady Halfa, we returned to Cairo to occupy ourselves in squaring up our accounts, a matter of the utmost difficulty in those days when they were kept on the ordinary peace plan and there was no local auditor ; and when the Ordnance officer's life was made miserable for months or even years afterwards answering queries. So ends Mathew's story.

The whole detachment returned to Cairo immediately after the occupation of Dongola. Conductor Linington was given a commission and the Adjutant General Egyptian army reported most highly on the good work done by Sub-Conductor K. Loney and Lance Corporal C. Savage, A.O.C., attached to that army. Loney, it will be remembered, was also mentioned by the Sirdar in 1889.

Soon after the Dongola expedition, a revolt of the Matabeles and Mashonas called the Corps again into the field. Captain Marquis with one warrant officer and four rank and file were posted between Umtali, Marandellas, Port Salisbury and Beira. Sub-Conductor G. A. Parke proceeded to Bulawayo, which was defended by the British South African Company. This warrant officer organized Ordnance services for the company and remained at Bulawayo during the operations which culminated in the defeat and rout of the Matabele Impis. Earl Grey, the newly appointed Administrator, who was present in person, in reporting to the Commander-in-Chief, "expresses approbation for the very valuable work done by Sub-Conductor G. A. Parke, A.O.C. He has done work for the company outside ordinary military duties, and I cannot speak too highly of him. The directors desire that the services rendered

may be brought prominently to the notice of the Field Marshal, the Right Honourable Viscount Wolseley, Commander-in-Chief." Parke received a commission.

Early in the following year occurred the short but sharp Benin campaign, which arose from the treacherous massacre of a peaceful mission that had gone out under the acting Consul General for a palaver with the King of Benin. A punitive expedition was promptly got together by Admiral Rawson, the commander of the naval squadron of the Cape, consisting of detachments from the various vessels and the Hausa soldiers of the Protectorate. The expedition is perhaps memorable in that the only army representatives were three Ordnance non-commissioned officers under Captain T. W. Hale. At the mouth of the Brass river, the force was transhipped in small steamers to Warrigi, about forty miles up, where it landed. A base camp was formed at Ciri, ten miles inland, whence the force pushed on to Benin. The main body had to fight its way up from the river—a most determined resistance being offered to Admiral Rawson who, in the affair which preceded the capture of Benin city, lost several of the officers of his flying column. The town reeked of human sacrifices, and some of its sights were past description. The King escaped into the bush, and did not surrender until August, when he was taken as a prisoner to the coast. Hale reported most highly on the manner in which his men had carried out the work allotted to them.

In 1898 the naval and military forces of Great Britain were employed in Europe. Trouble had been brewing for years in Crete, that isle of unrest and nest of Turkish misrule, until it culminated in the attack by Mahommedans on a small body of British troops and bluejackets, who had been landed at Candia, the massacre of 800 native Christians and the pillaging of the town. This brought matters to a crisis. Admiral Noel, commanding the Mediterranean squadron, handed an ultimatum to the Turkish Governor, and British reinforcements were hurried to Candia, among whom were one warrant officer and ten others of the Corps. Sergeant J. Parsons

and Lance Corporals Kirby and Dingle were highly commended for the manner in which they performed their duties in Crete.

The beginning of the year 1898 witnessed energetic preparations for the prosecution of the Soudan campaign, for which the time and occasion were now ripe. Kitchener, the Sirdar of the Egyptian army, asked for and had placed at his disposal a brigade of British troops among whom was No. 1 Company A.O.C., which proceeded from Aldershot to Egypt on January 22nd, 1898. Heron, the senior officer of the Ordnance detailed for the expedition, had the misfortune not long afterwards to fall foul of Kitchener, an autocrat who would brook no argument or opposition, and Ordnance services eventually came once more in charge of Mathew. Besides having been at the Ashanti campaign of 1895, Mathew had long experience of warfare in Egypt; not only was he present during the Dongola campaign, but he had served as a regimental officer in the Frontier Field Force during the Soudan campaign of 1885/6. It is to his pen that I am again indebted for the account which follows.

I arrived at Wady Halfa, the base of the actual operations, with two corporals of the Corps on January 25th. The British brigade had already moved forward, and the D.A.A.G. handed me over a long string of incompletd indents. I suppose we shall never learn that in every campaign it is essential that an Ordnance officer should arrive with or before the first troops. The A.S.C. officer in charge of supplies (Supply and Ordnance services were amalgamated in the Egyptian army) told me that everything which had arrived had been forwarded on, but apparently not consigned to anyone in particular. I had therefore to supply the British troops by borrowing from Egyptian army stocks until, gradually, a certain modicum of stores and clothing arrived from Cairo.

Towards the end of February, Colonel Heron, Captain Collins, two warrant officers and nineteen other ranks of the Corps came up; and Conductor Johnson was sent on to Spereik (railhead), where the British brigade

was situated, to take over transit duties for both Ordnance and Army Service Corps supplies.

On one occasion when Kitchener was dining in mess, he referred again to what he called the absurdity of having two departments to deal with the one job of supply. And when I pointed out the necessity of technical training for officers dealing with technical stores he retorted, "Very well, we will have Ordnance officers and make them do A.S.C. work"!

About this time complaints began to arrive of the bad condition of the boots of the brigade. There was no Ordnance officer with the troops, and regimental officers waited until their men were practically bare-footed before making known their needs. As soon as this came to Heron's notice he took energetic steps. All available stocks were sent forward and arrangements made to collect the shoemakers of the brigade and start organized repairs. But when the troops were ordered soon after to leave railhead and encamp beyond Berber, I heard that many men finished the 135 miles' march in their socks.

Our workshop at Wady Halfa was very small; no native artisans could be got, and the chief work consisted in making serviceable what arrived from Cairo.

Towards the end of March, Conductor Johnson, who had moved with the advance of railhead to Bastinab, fell sick and was relieved by Captain Collins with Private Barry, who served as the model of the R.A.O.C. soldier in our South African War Memorial at Woolwich.

On April 8th, after a reconnaissance in force, the Sirdar decided to attack a large body of some 2000 Dervishes under the Emir Mahmoud who were entrenched on the Atbara river. The enemy positions were taken after severe hand-to-hand fighting, Mahmoud was made prisoner, and the Dervishes routed with severe losses. Armourer Sergeant Woollam, who was present with a Maxim battery, was highly commended for repairing a gun under fire.

After the Battle of the Atbara, we went into summer quarters at Darmali. Conductor Robertson, than whom

I could not have wished for a better assistant, had already joined the brigade, and we now set about reducing the chaos of stores and accounts into some sort of order ; the Brigade General readily consenting to my employing as many tradesmen as were to be found in the ranks of the infantry. A job that gave me a sleepless night or two was to cut and weld the tyres of wheels shrunk by the heat. Our only implements were a field-forge and some coal borrowed from the railway, but we eventually made a job of it, effective if lumpy.

At this time Kitchener sent for me and questioned me as to our arrangements for an advance to Omdurman, where it was believed that the main portion of the Dervishes under the Khalifa were concentrated and would make a stand. I pleaded that Ordnance representatives might accompany the troops but could extract no promise. In those days there was appalling ignorance among staff, and indeed all, officers as to the methods of the Ordnance. They did not realize that an Ordnance officer, in making his arrangements for supply, must have information on which to work. Even to ascertain the strength and composition of the force to be catered for was a matter of great difficulty. At this time also a second British brigade with cavalry, artillery and other details arrived to reinforce the Anglo-Egyptian army ; and the whole strength of the Corps in the Soudan to deal with the equipment and clothing of what was now a British Division comprised 2 officers, 2 warrant officers, 10 sergeants and 24 rank and file.

I cannot remember whether I got any order to join the British force when it advanced to Wad Hamed, probably I did so verbally from General Gatacre who was in command ; but the fact remains that I got there, taking with me two or three of the Corps. Unfortunately, the first person I met on my arrival was the Sirdar himself who said, " Oh you've come, have you ? " and for days after I lived in expectation of recall to Darmali ! But there was plenty of work for us, as the troops were to march the rest of the way to Omdurman as lightly equipped as possible, and masses of stuff, including

greatcoats, were handed in. I was given two barges and some native boats to convey all this to Royan Island, a few miles further south, where a reserve supply and ammunition depot and a hospital were being established ; and while there Captain Hale arrived to help.

On August 25th the division started on its final march to the south. Hale was ordered to remain behind while I was sent forward and told to take charge of the small-arm ammunition section of the camel ammunition column. The march continued till September 1st when we halted about six miles from Omdurman ; and at daybreak the next morning the Dervishes attacked, pressing on with desperate courage under a hail of bullets to within 600 yards of our line, where they melted away under the appalling fire, leaving many thousands of dead and wounded on the ground. There was a shout for ammunition almost from the start of the battle, and the two or three men of the Corps I had with me had a busy time carrying boxes of ammunition up to the firing line. We issued every round we possessed, and Corporal Leckie, if I remember aright, was slightly wounded, while some of our camels were shot.

Soon after, while making our way with our ammunitionless camels across the battlefield, in search of the remainder of the ammunition column, we fell in with some Egyptian army transport camels. Just as we joined forces, heavy firing started on our right ; and we were alarmed to see some 20,000 Dervishes charging down on Macdonald's Soudanese brigade which we were following. The position for a short time was alarming as the rest of the army was more than a mile ahead. Macdonald formed square and the Dervish cavalry, who opened the attack, were simply annihilated. The Dervish infantry made a desperate effort to break the square, but the Soudanese stood firm and mowed them down by thousands. As soon as the position was appreciated a British brigade was sent back to Macdonald's relief, but the courage and steadiness of the Soudanese had saved the day before they arrived.

With the complete defeat of the Dervishes at Omdur-

man the campaign came to a close ; and on September 4th a funeral service was held at Khartoum to commemorate the death of General Gordon, attended by representatives of all units. The Sirdar's eye fell on me at this service ; he told me I was to leave the next day and that if my stores were not cleared out of the Soudan in about a week, he would want to know the reason why !

Mathew was mentioned in the Sirdar's dispatches and awarded the D.S.O. for services in the expedition, and Hale was also mentioned in dispatches. Collins who, though he nearly died of sunstroke, lived to complete forty years of service in his beloved Corps, well deserved his grant of the Turkish Imperial Order of the Medjidieh. Armourer Sergeant Woollam, whom we heard of at Atbara, was present at Omdurman also ; he was mentioned in the Sirdar's dispatches and was awarded the medal for Distinguished Conduct in the Field. Conductor (later Lieutenant Colonel) Robertson, who also was present at Omdurman, received the medal for Distinguished Conduct in the Field and was given a commission. Thirty-two men all told, most of whom were attached to the Egyptian force, were mentioned in dispatches.

Omitting for the moment the South African War, which is dealt with below, there was a small campaign in Somaliland, 1902/3, where Major P. A. Bainbridge was in charge of the Ordnance with a staff of some thirty men, and where Armourer Staff Sergeant Gibb was awarded the Distinguished Conduct Medal for repairing a Maxim gun under hot fire. A minor operation undertaken by local troops followed when, at the request of the Colonial Office, Conductor (now Major) Donnelly was sent out to organize an Ordnance depot.

On October 9th, 1899, the Transvaal handed its ultimatum to the British Agent. Two days later Great Britain embarked on a campaign which, in the event, proved to be the first since the Napoleonic Wars that required a prolonged national effort.¹

¹ For map see end of chapter.

The Corps was fortunate in having as Director General of Ordnance General Sir Henry Brackenbury, the most capable administrator among the group of distinguished men who followed Lord Wolseley's career, and John Steevens as its chief at Woolwich. But at the seat of war the Ordnance was still no man's child, the staff knew little of its functions and methods, and the campaign presented very special difficulties. The tract covered at one time or another by operations was vast and means of communication scant, so that even when supplies were plentiful it was by no means easy to have what was wanted where it was wanted. It was the first war in which matériel played a part in any way commensurate to its rôle in the Great War, stores and ammunition being consumed on a scale hitherto undreamt of. Artillery and other equipments were no longer quite the simple affairs of the past. It was the first campaign in which the Inspector of Ordnance Machinery and Armament Artificer took part, the first in which ammunition was tested and repaired on service.

The Ordnance was faced with a variety of unknown problems; it was understaffed, short of stores and without properly equipped workshops. No cut-and-dried scheme existed for supplying the troops as they advanced, nor for repairing guns, etc.; no regularly organized chain connecting those in the field with the depot that held what they might need. Each link had to be forged on the spur of the moment according to the vicissitudes of a very long-drawn-out campaign. The Ordnance had largely to improvise and work out its own salvation without assistance, yet it always managed to surmount its most pressing difficulties. That this was so was mainly due to individual effort on the part of officers, many of them youngsters, and to the zeal and initiative of the rank and file; rather than to any help it got from the higher command or indeed from some of its more senior members in South Africa who belonged to the old school. It has been said that South Africa was the grave of reputations, but many of the Corps who rose to

distinction in the Great War served their novitiate of active service in this campaign.

At the outset mobilization, undertaken in what we should now regard as a very leisurely manner, would have proceeded smoothly enough, for mobilization equipment was assembled for the force detailed for the expedition. But complications were caused by changes only discovered to be necessary at the last moment. Every vehicle had to be fitted with a more powerful brake, while transport wagons had in addition to be adapted for ox-draught; artillery harness was in process of conversion to quick-release pattern which meant the fitting of poles in place of shafts, and everyone had to be provided with khaki, an unforeseen liability. It was on Woolwich, Pimlico and Aldershot that the brunt of this work fell though other depots had their share, especially Portsmouth and Southampton, where most of the troops embarked. However, despite these difficulties, the programme of embarkation proceeded without hitch, though units were sometimes only completed with their last complement of equipment on board ship.

The troops, regular, militia and volunteer, that followed were equally well equipped, but no war reserve existed, stocks at home were exhausted in the process, and for long demands of every kind, that soon poured home from the seat of war, could only be met fractionally or not at all. Fortunately, Cape Colony contained sources from which supplies could be amplified. There were railway workshops, and others well equipped for turning out ox- and buck-wagons or other trek gear, while merchants' stocks could be drawn upon, even to improvise uniform; and later on use was made of civil establishments at Pretoria and elsewhere. From first to last purchases in Cape Colony alone totalled two and a half million sterling.

To provide for the ordinary small garrison there had been 3 Ordnance officers with 20 other ranks at the Cape, and 2 officers with 40 others in Natal. In August, when relations with the Transvaal Government were becoming strained, the numbers were increased to 7 and 114.

Shortly after, when rupture seemed imminent, it was decided to strengthen the weak garrison and among the first troops to be hurried out were five companies of the Corps. On the actual outbreak of hostilities, there were thus 446 of all ranks either in the country or on the high seas. When war was declared and the reserves called up, of 225 A.O.C. reservists there was but one defaulter. These, together with the rest of the men serving with the colours, were sent out during the next six months. Recruiting proceeded apace and in all 1204 men of the Corps took part in the campaign, the average strength being 950.

In the aggregate the gross total of the fighting forces, including colonial and irregulars corps for whom we had much to provide, did not fall far short of 450,000 men ; while the strength of the regular army alone during the greater part of the war never dropped below 151,000. These figures speak for themselves as to the paucity of Ordnance personnel, especially when it is borne in mind that the time of greatest pressure occurred when the numbers were fewest. To some extent the deficit was made good by employing civilians, the number of whom borne on the books rose to over 2000.

The scheme of operations was twofold. The main army landed at the Cape and was to advance northwards from Cape Colony, while a subsidiary force attacked the Boer Republic from a base in Natal.

Taking the principal campaign first. Colonel Clarke, who came out as Principal Ordnance Officer, established his office at Cape Town, the rôle he took up being mainly that of Inspector of Ordnance services on the lines of communications. The small depot there was obviously quite inadequate, and was expanded by taking over sheds at the docks and other premises. Soon afterwards additional bases were established at East London and Port Elizabeth so that three lines of supply stretched away to the north, the plan being to concentrate particular categories of items at each base. To attempt an account of all the depots that existed at one time or another would be unprofitable and tedious. The prin-

ciple was to open a depot in connection with one of the three bases whenever there was a sufficient concentration of troops to justify its existence. As the troops moved forward this might throw out one or more transit or repair branches which would remain open as long as necessary ; sometimes with a very brief existence, at others expanding into importance.

The advance of our army under Lord Methuen was by the western line, and the Orange and Modder rivers were successfully crossed with the intention of relieving Kimberley, a stronghold of British interests invested by the Boers. On October 10th Major (the late Major General Sir Harold) Parsons was sent up this line to open an advanced depot at De Aar, an important junction 500 miles to the north of Cape Town. Beginning with the modest staff of one warrant officer and nine other ranks, this quickly became a very important centre for supplying the troops in their march northwards. Then, in December, came the serious defeat of Magersfontein, after which Lord Methuen entrenched his troops on the line of the Modder river, De Aar having a strenuous time in furnishing camp equipment and stores in general. Lord Roberts, with Kitchener as his chief staff officer, arrived ; and in January 1900 there occurred the greatest effort at concentration of the whole war, the collection of troops, guns and transport for a forced march on Bloemfontein.

It was then that the presence of the head of the Ordnance would have been specially valuable. The depot officer had no alternative but to work day and night to meet the very heavy demands that poured in, even though he might suspect someone had blundered. A senior officer with army headquarters, acquainted with Lord Roberts' intentions, would have seen that the preparations for advance were not encumbered with a superfluity of goods, such for instance as field-forges, when the essential matter was that the troops should travel light. He would also have given timely notice of the forward movement that was to follow. As it was, the evacuation of the camps was only known to De Aar

by accident, and in sorting out and getting ready all that was left behind it was found that a large proportion of what regiments had been clamouring for during the past weeks was still in unopened packages, unused and unwanted. The job was not completed a moment too soon ; for immediately our troops entered Bloemfontein, on March 13th, 1900, De Aar was called on, by wire from the chief of the staff, to send up at once camp equipment for 30,000 horse and foot.

With the entry into Bloemfontein communication with the Cape was by the midland line, based on Port Elizabeth, the centre of activity being at Naauwpoort where Major Moulton Barrett, a most energetic officer, was in charge. The first imperative necessity was to rebuild the bridges destroyed by the enemy in his retreat ; for the army, after its succession of rapid marches, was perilously near destitution—short of food, clothing and medical comforts.

On March 18th Captain Wrigley opened a temporary depot in Bloemfontein and some days later Major Butcher arrived and started an extensive establishment outside the town to receive the stores that began to arrive from both the midland and western lines. By dint of strenuous exertion the army was, in a few weeks, ready for a further advance into the Transvaal, but concurrently with the work of refitting combatants, the Ordnance had to provide for what was almost an equivalent army of sick and wounded. Enteric had made its appearance and for several months raged with great virulence. To equip the hospitals required for some 4000 sick was a formidable task superimposed on that of providing for the sound. The depot at Bloemfontein at this period was the largest field depot ever so far established, a tented city covering 23 acres. Yet, as elsewhere, the Corps was handicapped by shortage of staff. Its strength at Bloemfontein touched its maximum at 7 officers and 152 other ranks, of whom many were in hospital. This staff had to cater for 15,000 mounted regulars and 48,000 dismounted, besides a colonial division and various irregulars.

A pause at Bloemfontein, and the army continued its march without serious check, and now the Ordnance was engaged in hurrying forward the equipment needed for its maintenance, a depot at Kroonstad further north being established for which Bloemfontein had to find the staff. Pretoria was reached on June 5th, 1900, and if the condition of the troops was bad on attaining the Free State capital, it was little better on arriving at that of the Transvaal. Around Pretoria lay an army of over 40,000, destitute of many absolute essentials. Within a few days indents topped 3000 and of stores there were none. Here the Ordnance was represented, besides two or three non-commissioned officers and men, by Captain Wrigley as Ordnance officer with army headquarters. It had apparently occurred to someone that it might be useful to have a representative of this branch with the mobile force, and Wrigley was thrust into a Cape cart and left to make the best of his way, narrowly escaping capture *en route*.

Fortunately, both Pretoria and Johannesburg held large stocks of merchandise and materials that were of use, for the Boers had systematically destroyed large parts of the permanent way and bridges. New railheads were set up as reconstruction proceeded from one gap to another, what arrived having to be dumped at the time-being railhead. The army transport could only carry a limited quantity, and for months the various spots that had been railhead were littered with stores ranging from ammunition to hospital equipment. This explains how an urgently needed consignment of 12,000 coats, British warm, a large number of 9·45-inch howitzer shell and other goods were lying at an unimportant wayside station like Roodewal when De Wet captured the place on June 7th, 1900. The burghers possessed themselves of all the booty they could carry and burned the rest to the value of some £100,000.

On this occasion Kitchener's driving power and unrivalled knowledge of railway work in war time came to the rescue. He took control of the whole railway system, which brought him into direct personal relations

with the Ordnance. Except for men, horses and food-stuffs, not a single thing was allowed to be sent up from Bloemfontein without authority from its Chief Ordnance Officer. With this aid and the arrival of personnel matters improved, and in a shorter time than had seemed possible everything really essential for the troops was forthcoming.

Meanwhile, Kimberley had been relieved on February 15th, a depot being formed there which later, under Parsons, became an important centre. The relief of Mafeking followed on May 17th, and here also a depot was opened under Captain Slade Baker.

Turning next to Natal with its independent striking force. Here the principal pre-war depot was at Fort Napier, Pietermaritzburg, with a subsidiary depot at Ladysmith, and a small establishment at Durban to deal with shipping. As soon as hostilities became inevitable, the Ladysmith depot was filled up with all available stores for the use of the force in its advance, and reinforced by an Indian Ordnance Field Park that arrived with the contingent of troops furnished by India. Here, however, as at Magersfontein, we at first suffered heavy reverses, our troops having to fall back on Ladysmith which, by November 2nd, 1899, was completely invested.

Pietermaritzburg now became the centre of Ordnance activities, and was busily engaged in fitting out the troops, regular and irregular, concentrated for the relief of Ladysmith, a serious handicap being the loss of stores and personnel shut up therein. A series of storehouses and wagon sheds adjacent to the depot at Fort Napier was acquired and proved an invaluable asset, as did the existence of railway workshops and other factories, especially those making wagons and harness.

In Natal the situation was easier to cope with, the work being all at or near the base. Colonel Appelbe, Chief Ordnance Officer, being in touch with the G.O.C. lines of communication, had timely notice of what was wanted and when ; and transport, the greatest difficulty in the advance from Cape Town, was a simpler matter, distances being comparatively short.

With the annals of the memorable siege of Ladysmith and of the various attempts to relieve it we are not here concerned. It must suffice to say that No. 4 Ordnance Company with the Indian Ordnance Park, shut up in the town, shared all the privations of the beleaguered garrison, that the depot was often under shell fire, and that valuable work was done in providing for the troops, fitting out hospitals and repairing equipment. The success of Lord Roberts in the Free State indirectly reduced the pressure on Ladysmith which was relieved on February 28th, 1900, setting free the Natal force to join in the general advance on Pretoria, with the occupation of which, and the consolidation of the points actually gained, the first phase of the war came to a close.

The second phase, when operations were those of guerilla warfare, may be said to date from the assumption by Lord Kitchener of the supreme command in November 1900. Annexation had been achieved, absorption remained to be accomplished. From now onwards the campaign had two objects. On one hand was the pursuit and capture of the Boer commandos that roamed the country, endeavouring to harry our communications, pick up small bodies of men and thus replenish their arms and equipment; on the other the prevention of their obtaining supplies from their own homes. The first task involved nothing less than a complete remobilization. A new army, modelled on new lines, had to be placed in the field, and a new strategy evolved. The essential was to form columns of troops, lightly equipped and capable of rapid movement. For this purpose large bodies of mounted infantry were created, even the gunners leaving their guns behind and being turned into Royal Artillery Mounted Rifles. The second entailed the wholesale destruction of farm and homestead, carrying with it the necessity of providing for the evacuated non-combatant. Large concentration camps for women and children sprang up, besides many for prisoners of war. The numbers rose by leaps and bounds until, in October 1901, the figures reached

118,000 white persons and 43,000 coloured. On the Ordnance devolved the duty of providing this large assembly with tentage, bedding, clothing and indeed all the requisites for a reasonably high standard of life.

In April 1901 Colonel Clarke was invalided home, and succeeded by Colonel Appelbe as Principal Ordnance Officer. His office was installed at army headquarters, Pretoria, and Ordnance services were reorganized. The whole of South Africa was divided into four main areas, Cape Colony, Natal, the Orange River Colony and the Transvaal, each administered by a Chief Ordnance Officer. In addition Major R. W. M. Jackson became Chief Ordnance Officer base ports with the special duty of providing for the whole theatre of operations. He was in fact the headquarter representative at the base, dealing with statistics and stock-sheets, setting off a possible surplus in one area against a deficiency in another and framing consolidated demands on England.

Although methods were by now more systematized and demands more promptly met from home, in the shifting phases of this guerilla warfare there were continually new and unexpected problems to be faced, besides those due to the remodelling of the army and the formation of concentration camps. Now some great concentration of massed columns would be made preparatory to an organized drive, and efforts must be absorbed in meeting its requirements. Now a flying column, semi-destitute and ragged, would make fleeting contact with the railway, equipment and clothing having to be rushed out at any hour of the day or night. Now the likelihood of attack on some weakly defended town would make it necessary to strengthen the defences, and small-arms, guns and ammunition must be at once provided. Or an engagement might already have taken place, loss or damage having to be immediately made good. At another time it would be a commando that had surrendered, and its arms and ammunition must be taken in.

At this time the railway served, not only as a line of communications, but also as a base from which operations were conducted up and down the country. It was

continually harassed by the enemy, who reduced the destruction of bridges and telegraph lines to a fine art. One of the first steps taken by Kitchener was to strengthen the railway defences, and the idea took shape of converting it into an impassable barrier by means of block-houses at intervals varying from a mile to 200 yards, reinforced by armoured trains. Later, as belt by belt of territory was absorbed, these block-houses were pushed out in many directions on lines of kopjes as well as on the railway. For the construction of these works the engineers were responsible; to the A.O.C. fell the task of equipping them. Shiploads of barbed wire were necessary, and immense quantities of stores—bedding, furniture, tools and utensils, besides old-pattern small-arms and ammunition for use as improvised spring-guns or other forms of alarm.

A war of attrition against such a mobile adversary as the Boer operating on his native soil was a lengthy process. It dragged on till early in 1902 when, bereft of leaders and destitute of arms, equipment and other necessities, terms of surrender were first discussed. Peace was declared in April, a house in Pretoria, next the British Residency, being elaborately furnished by the Ordnance to house the Boer delegates.

Following the harvest came the aftermath, always an operation of very serious magnitude for the Corps. While the joy bells ring and the troops march merrily home the Ordnance have to take over masses of war-worn matériel, sort out and take stock of the whole, straighten out equipment accounts, set on one side what is still wanted in the country, pack and ship home what is serviceable and needed elsewhere, and dispose of the balance to the best advantage. Among the first to arrive, the Corps is always the last to leave. The situation was by no means eased by the fact that side by side with the regulars were a great number of temporary troops, colonials, volunteers from England and South African irregular corps. These dealt with equipment in a very light-hearted spirit, their one anxiety was to get rid of their gear with all possible speed and be free.

To cope with this work, large dumps were formed at important centres where the stuff was examined. Opportunities of converting swords into ploughshares were exceptionally great ; the whole countryside was denuded. Tentage and shelters were wanted for repatriated burghers, mules and oxen ceased to drag guns and, with buck- and ox-wagons, returned to peaceful agriculture. Block-houses, wire entanglements and entrenching tools were valuable assets to a race of farmers. Lord Kitchener, before leaving in June 1902, had sold to the civil authorities goods to the value of nearly one and a half million and this figure was subsequently largely increased. In fact there was no conceivable domestic requisite from beds to wooden legs which the Ordnance was not called on to furnish. Another method of disposing of surplus stocks was by direct sale. It is of interest to note that in the financial system which Kitchener worked out was included a sales department, somewhat on the lines of the Disposals Board set up after the Great War, but only operating in South Africa. For Ordnance stores, however, the arrangement proved unsatisfactory, for this new staff knew little about the stores it had to sell. Eventually it was found best to leave the disposal of its goods to the Corps, under the supervision of the Chief Ordnance Officers of areas. Even so, much excellent equipment remained that of sheer necessity had to be destroyed, especially harness and saddlery which became a drug on the market. Finally there were quantities of ammunition either dangerously damaged or not of service pattern, which were destroyed by blowing up or drowning in the deep sea. The extent of these operations can be gauged from the fact that they occupied two or three years.

This sketch of Ordnance services in South Africa needs supplementing as regards certain special phases of the work.

Apart from the fact that there resulted the definite allotment of responsibility for every supply service to one chief staff officer, the Quartermaster General, the

most important lesson of the war, from the point of view of the supply services, was that it proved the need of Ordnance representatives with each main body of troops.

The Crimean War, which involved a great winter siege operation, was the first occasion when our army really needed much in the way of extra equipment or clothing ; and that war led to a great advance in arrangements for their supply. In the early campaigns mentioned in this chapter an Ordnance detachment, with a convoy of stores, followed a march or two behind the troops ; and when an engagement was imminent part of this convoy, with a reserve of ammunition, would be pushed up to its scene. Then came the campaigns in the Soudan, served by rail and river, where there was less need to keep supplies so close at hand. Moreover, most of these campaigns were conducted against barbaric races, unorganized and ill-armed, to subdue whom required little effort and still less matériel. The haphazard way in which Ordnance services were run in the Soudan, under such a genius for organization as Kitchener, shows how little need there was for them to function except at the base. If anything, progress was in a backward direction.

The characteristics of this war, the amount of matériel needed, the length and difficulty of communications, its dispersed nature and the need of refitting with celerity when neither the time nor place of refitment could be foreseen, were quite novel to us. In such conditions Ordnance representatives with the troops would have been most helpful. Having no one to look after their interests, regiments (there were honourable exceptions) would demand far more than they needed at the moment to guard against the possibility of going short later on. Moreover, peripatetic columns could not be linked to a particular depot. To render assurance doubly sure, they would not infrequently indent on two or even three depots for the same articles, and then perhaps, pending delivery, help themselves by commandeering a consignment for someone else, side-tracked at some station. This became a common practice in the later phase of the

campaign. A surprise visit to one irregular corps, four hundred strong, resulted in ten truck-loads of goods, mainly clothing, being unwillingly disgorged.

In the stress of war, it is impossible to provide Ordnance stores by scale like rations. The only way to decide whether a demand is legitimate is by investigation on the spot. The Ordnance officer at a far-distant depot could not criticize an indent. He could but assume it was in order and do his utmost to comply.

This tendency to over-demand was aggravated by grave difficulties in transport. After the advance on Pretoria, Kitchener himself assumed control of the railway and saw that Ordnance stores received their share, but the occasion was unique and the Ordnance had as a rule to fight its own battles. It is true that the railway transport officer and Army Service Corps were there to serve as intermediaries between the depot and front line, but troops and horses with their food had first lien on the railways, and the A.S.C. officer's primary care was his own supply branch; with the result that stores and clothing were left pretty much to take care of themselves. Nevertheless, it was the Ordnance officer who was blamed if he did not deliver the goods, and for his own credit he was forced to become his own transport officer, cajole the railway staff for trucks, load and off-load them, send out his own convoy-men, who could ill be spared, and try to follow the tortuous destinies of his consignment until it reached the regiment or column for which intended. Yet even so it was the exception rather than the rule for the whole to arrive promptly and intact. Before military control of the railways was properly organized there were extensive depredations by regular gangs of thieves; regiments acquired the habit, rightly or wrongly, of helping themselves to anything they could pick up, and stocks were not over-plentiful. These factors were cumulative in effect and often resulted in wanton and reckless extravagance.

In theory the regimental account should have served as a check. Regiments were supposed to keep equipment and clothing ledgers as in peace, in which every transac-

tion was to be booked up; and they could not clear their charge except against a voucher receipted by the Ordnance depot. But the system broke down completely under the strain of the campaign and regimental accounts resolved into hopeless chaos, particularly in the case of the many temporarily raised bodies who knew nothing of army accountancy methods and would say—very naturally—that they had no time to bother about such minutiae when fighting.

The procedure involved a wearisome chase up and down the country for the commanding officer's signature and completion of the voucher "in the right-hand top corner." Reminder after reminder would be sent out without avail. Such an incident as the following was a common occurrence. A dozen columns are in pursuit of De Wet. Column A wires for stores to be sent to a certain spot. De Wet, with characteristic perversity, doubles on his tracks with Column A hot foot after him. Column B touches the appointed spot, wants some of the stores and annexes them. Then the chase goes on, Column A after De Wet, the Ordnance officer through the field post after Column A. When the Ordnance officer eventually learns what has happened he also hears that Column B is broken up and dispersed.

The Ordnance had to carry out the law as it found it, but the attempt to administer an impracticable system entailed incessant unnecessary correspondence, and caused not a little irritation which neither tended to good feeling between the rest of the army and the Corps nor to the good of the service generally. There resulted also a psychological reaction on the Ordnance officer. When he thought of the hundreds of vouchers he had just signed, of the per-centage which would reach the consignee, and of the far smaller per-centage that would ever return "duly signed and completed," is it surprising if he should ask himself whether the game was worth the candle, and that efforts to keep accurate accounts were liable to be relaxed?

There were no War Office auditors present in South Africa. Accounts at that time were examined nowhere

but in London and the auditor was looked on as an enemy. But in the first hour of peace came rumours of their arrival. They came, they saw—but whether they conquered is another matter. At any rate they set about an almost hopeless task with a cheery optimism. From being feared as spies they came to be regarded as friends in need. The ragged war account—then in permanently bound volumes—interleaved and swollen to bursting point, was patched up to look as decent as possible and laid to rest in Whitehall. A serious attempt was for the first time made to cope with the problem of stocktaking. With accounts in such confusion it had been impossible to balance the ledger and compare the remain with the stock, and even after peace was declared, it was long before anything approaching accuracy was achieved.

The special importance of this visit was that the War Office, through its financial representatives, received overwhelming first-hand evidence of the insuperable difficulty of maintaining the usual peace system of accounting by double entry on service; with the result that regimental clothing and equipment ledgers were abolished in time of war. A more effective check was sought after by including an Ordnance officer in the war establishment of a division, to whom units were to submit their indents and who was to attend generally to Ordnance services within his formation.

The war also brought out the value of the Ordnance engineering staff and workshops on service. Even the comparatively simple artillery equipments of that day wanted frequent overhaul, spokes and felloes shrank in the dry climate, tyres constantly had to be tightened up, and masses of equipment of all sorts had to be repaired.

When the 10th Division advanced on Pretoria, one of the Inspectors of Ordnance Machinery, Captain Davies, accompanied it for a time with a few tools and artificers, not only effecting repairs but attending to other wants. He may indeed be said to have been the forerunner of the D.A.D.O.S. of a division on this occasion. Another, Captain R. L. Clarke, also served in this dual capacity for a while in the Colesberg area, where a workshop and

depot combined was under his charge at Rensberg. This establishment had a very narrow escape. On February 13th, 1900, orders were received to evacuate by daybreak on the 15th, the time being subsequently advanced to the previous midnight. The place was crammed with gun carriages and other vehicles, small-arm ammunition and equipment of all sorts. To repair as much as possible and remove the rest by rail was no small feat for the small detachment, and the work was only just finished in time. The last train, with the last horse-shoe nail and personnel, steamed out at 12.15 a.m. and within a couple of hours Rensberg, with the few infantry still left, was captured by an overwhelming force of the enemy. This, however, was but a small, portable plant. To dismantle heavy forges or machine-tools worked by power and erect them elsewhere is a lengthy process; and the difficulty was overcome, as best might be, by fitting out a travelling shop on rail which could be sent about the country.

The technical staff of the Corps indeed on many occasions did very creditable work. Captain Paul succeeded in mounting a 9.2-inch gun on a travelling railway carriage. The design was his own, the work being done under his supervision in the Cape Government railway locomotive shops; and although never used in action, firing trials were successful. Two 6-inch guns similarly mounted from designs by the same officer were moved up to Kimberley immediately after its capture and took part in more than one affair. Paul was also responsible for the design of the improvised field carriage which enabled two 5-inch B.L. guns (known colloquially as cow guns) to accompany troops in the field. Another episode concerns the siege of Ladysmith. Among the armament rushed into the defence were two 6.3-inch howitzers, obsolete weapons unearthed in Cape Town with eight hundred rounds of ammunition. The powder, damp and mouldered with age, was useless until restored by blending what was best with that from mountain-battery cartridges. Castor and Pollux, as the veterans were dubbed, did useful work until the former

was put out of action by a direct hit, when gun and mounting were returned for repair. By dint of working over forty hours on end, Staff Sergeant Ford, who received the Distinguished Conduct Medal, with four other Ordnance men assisted by railway mechanics, entirely reconstructed the carriage, so that Castor was promptly in action again. A record of this achievement is preserved in the archives of Ladysmith. Yet another interesting piece of work was the reconstruction, at Pretoria, of a Boer Long Tom from several pieces of guns destroyed by the enemy prior to our arrival. This reconstructed gun was presented by Kitchener to the City of London, and now lies in the Guildhall.

In the last phase of the war there was little use for guns. They were replaced, as artillery arms, by Colt guns mounted on Dundonald galloping carriages, and the 1-pounder Vickers-Maxim or "pom-pom." These also gave ample scope for the artificer, carriages and other adjuncts being manufactured locally and instruction afforded in the use of the new weapons.

Among laboratory operations, the most interesting was the invention of a really satisfactory block-house alarm; for the Boer soon learnt the trick of avoiding or putting out of action the spring-guns and other contrivances at first used. After experimenting for a few days, Captain Partridge, assisted by Armament Staff Sergeant Bird, evolved what was known as the Kroonstad flare. The apparatus was of the simplest—a lead ball on an invisible trip wire which when disturbed dislodged a brick, the brick in falling fired a friction tube which in turn set fire to a few strands of cordite communicating with a bag holding some old blanketing or waste soaked in kerosine. The crack of the tube alarmed the block-house, and the burning waste lit up the country-side for a radius of half a mile. Lord Kitchener, after witnessing the operation of a sample, gave orders for the general use of this flare, and many thousands, which proved very effective, were made under the supervision of Staff Sergeant Bird.

It is easy to select striking incidents such as the above

from the life of the technical staff. To do so for the clerk or storeman is not so simple. And yet he equally bore his share in the heat and burden of the campaign. For him also no day was too long, no task too hard, no situation impossible. Take for example Conductor Shaw. A clerk and non-combatant, he was a soldier at heart, and never showed himself more a soldier than in the manner of his death. For over a year of incessant work he struggled gallantly on until, stumbling across the rails of the Petersburg-Pretoria railway station, he could only reply to his C.O.'s greeting with "I am 105, Sir." Within three hours he was dead. Can anyone doubt that this man gave his life for his country as nobly as any who fell on the field of battle? Nor was it all pure Ordnance work. There were occasions when the Corps had to turn out by night to guard the depot from attack besides carrying out its ordinary duties by day; others when the convoy-man would come back with empty bandolier after a raid on his train; others again when he was killed or wounded in some such engagement. In all two officers and eighty-three other ranks were killed or died of wounds and disease attributable to the campaign.

In 1903 a War Memorial in the form of a drinking fountain, on which were inscribed the names of the dead, was unveiled at Woolwich by Field Marshal the Duke of Connaught, who said that "No doubt other branches of the army had more chance of dying on the battlefield, but the Army Ordnance Corps have known how, by devotion to duty, and by nobly carrying out most responsible and arduous duties, to walk in the same way as all their comrades of other branches of the service." A Memorial was also erected in the cemetery of Bloemfontein. For his services as Principal Ordnance Officer, General Steevens was awarded the K.C.B. It had been due to his tireless energy that supplies reached South Africa in such quantities as they did, but he was the first to say that the honour was due to, and reflected, the loyal assistance rendered by one and all. Other awards were the C.B.—5, C.M.G.—6, D.S.C.—4, D.C.M.—14; and 21 officers with 50 other ranks were mentioned in dispatches.

PART V
MISCELLANEOUS ESSAYS

CHAPTER XVI

THE INDIAN ORDNANCE DEPARTMENT

INDIA was conquered or peaceably absorbed from the widely separated starting points of Fort St. George at Madras, Fort William at Calcutta, and the Castle of Bombay; the foundations of the three Presidencies that bore these names, each of which had its own troops, British and Native. As in the home army, regiments found their own clothing and equipment, and munitions were bought from the British Board of Ordnance. The fortified depots or Arsenalns were in charge of the gunners and thus there developed from these beginnings three Presidential Ordnance Departments, purely artillery organizations, with a subordinate civil staff of native artisans and lascars.

Neither the drastic reformatons that followed the Crimean War nor the subsequent War Office reforms of 1870 and 1887 extended to India; but, after the Mutiny, the East India Company was abolished and replaced by parliamentary control through a newly appointed Secretary of State. The white troops of the Presidential forces were then absorbed into the British army and some means had to be devised to outfit them as was now done at home. A few officers of the British Ordnance, the Military Store Department as it was at that time styled, were sent to India with a view to setting up a similar establishment; but the attempt was very half-hearted and fell through on the score of expense, India professing itself unable to provide suitable rates of pay. To avoid the cost of a new organization, India spread the work instead over several branches of the semi-independent Presidential armies. The three Ordnance Departments continued to find arms and ammunition, artillery equipments with their harness and saddlery, accoutrements, camp equipment and other technical gear. The Transport Departments found carts with their harness and some small stores. The Commissariat Departments provided clothing. The Military Works Departments, staffed by the Engineers, not only built

but equipped barracks. But while India was compelled to provide for British regiments, it continued to administer its indigenous troops on the old pre-Crimean plan to the utmost extent possible, only furnishing what they were unable to provide regimentally.

Another result of the abolition of John Company was that India had to bear the cost of maintaining what were now units of the British army, and this led to very complicated financial adjustments. Every time a regiment moved to or from that country, the whole of its arms, equipment and clothing was examined, either before it left for India or on its arrival elsewhere; and the same happened whenever a draft was transferred. Indian votes were debited with the value of everything carried there and credited with the value of what was brought away. The inspections were carried out by a Valuation Board comprising an officer of the British Ordnance specially detailed for the purpose and another, a retired officer of the A.O.D., borne on the establishment of the Secretary of State for India. The latter had to see that no equipment or clothing was taken that was not used in India and that no soldier went out unless properly clad and equipped. In fact he represented in general India's interests, keeping in touch with the War Office in all questions concerning such matters. Each item was individually examined and priced according to its condition, a Viewer from Enfield inspecting every rifle. The process would take a week or longer in the case of a battalion, and it certainly seems strange that the financial advisers of the two Governments never managed to devise some more simple scheme of adjustment on a general average basis.

Apart from this liaison there was no regular plan for co-ordinating the types of equipment used in Imperial and Indian services. India might adopt a new pattern introduced by the War Office or it might not. Sometimes there were weighty grounds why it should refuse to do so, either because it could not afford the money or because local conditions required a different article; but in other cases there was no possible reason for the

disparity which existed. The ordinary signalling flag, for instance, in use in 1914 at home and in India was fastened to its stick in a slightly different way, the difference being perfectly immaterial. Yet, because of this, a regiment on arrival was required to hand in its signalling poles and draw others of Indian pattern; the poles being kept for re-issue to the next regiment going home. This is an extreme and absurd case, but it is true to say that little more than spasmodic attempts were made to assimilate Indian and British equipment. There was no regular machinery for so doing, and many unwarranted differences existed. When the War Office indulged in improvements, India almost invariably lagged behind.

The next change was due to the amalgamation of the armies of India under one control. The Afghan wars of 1878/81 showed how unsuited the three Presidential armies, each with its independent supply services, had become; the development of railways had put an end to their isolation, and the potential enemies of India were no longer internal, but Russia and Afghanistan—external foes. To meet these changed conditions, the whole of the troops in India were placed under the Commander-in-Chief of Bengal, who had been made *ex-officio* head of British troops in the country when the East India Company disappeared. The process was accompanied by the consolidation, one by one, of the various military services, the three Ordnance Departments being amalgamated in 1884.

The central Government in India was conducted by means of a Council under the Viceroy, which included a Military Member, an officer of high standing to deal with military matters and finance; and his duties now embraced the consolidated Departments of Supply, Transport, Ordnance, Remounts, Pay, etc. But the Military Department, as the Office of the Military Member in Council was called, was as separate from Army Headquarters as was the War Office from the Horse Guards prior to 1870, the Commander-in-Chief

being only responsible for command. Moreover, the Military Member held a very strong position *vis-à-vis* the Commander-in-Chief. Being a member of the governing body of India, and having control of the purse-strings of the army, he could exercise great influence on military policy, whereas the Commander-in-Chief was only an extraordinary member of the Viceregal Council. The officer who, under the Military Member, administered the now amalgamated Indian Ordnance Department—styled Director General of Ordnance—owed no allegiance to the Commander-in-Chief. Some of his officers supervised the munition factories set up in India, while others had charge of the Arsenals where stocks were held; but apart from these and a few senior warrant and non-commissioned officers, also recruited from the gunners, the department was civil in character.

Such was the picture when, after the South African War, Lord Kitchener was sent to India with a mandate. He was to ascertain definitely what tasks the army, which had grown up in this haphazard manner, should be capable of undertaking, and to reorganize and fit it for the purpose in the light of his experience of modern warfare. Among the first points Kitchener discovered was that he, as Commander-in-Chief, had no control over his administrative services, no staff officer to deal with them, and no expert to advise him on any technical points that might arise. To a man of his calibre the position must have been intolerable, and he set about to plan a scheme which would abolish the anomaly and place the whole responsibility in his hands. Lord Curzon, as Viceroy, disagreed with his proposals; but he was upheld by the Home Government and carried his point after much controversy in Parliament.

The new organization then brought into force combined the offices of Commander-in-Chief and Military Member in Council under the new title of Army Member, and it created as well a Military Supply Member who, while not concerned with policy, was to provide for the

material wants of the army. With the prescience that marked so many of his measures, Kitchener seems to have foreshadowed a Ministry of Munitions, such as was found to be indispensable in the Great War ; but the idea was not systematically carried out when it came to details. The division of duties between the two Members should have been, on the one hand storage, distribution and maintenance, essentially military duties ; and on the other procurement—purchase, manufacture and contractual work—purely civil duties. That was the line of demarcation adopted for Supplies and Transport which came under the Quartermaster General, a staff officer to the Military Member, while factories for making army clothing remained with the Supply Member. There ought to have been a similar divorce between the military and civil work of the Director General of Ordnance but, very illogically, not only the Factories but also the Arsenals that served the army as Ordnance depots were allowed to remain under the Supply Member.

However, Kitchener's conception of a Ministry of Munitions had short shrift. Soon afterwards Lord Morley, when Secretary of State for India, decided that the expense of two separate offices dealing with military affairs was unwarranted. The Supply Member in Council was abolished and the whole of his establishments and staff—except that occupied with finance—were turned over to the Military Member. This was going to the opposite extreme, for the Commander-in-Chief had not only the military work of his supply services to administer but also the civil processes of manufacture and purchase. Besides his three chief staff officers, C.G.S., A.G. and Q.M.G., there were now three Director Generals—of Ordnance, Medical and Military Works—looking to him direct for orders ; and to co-ordinate all this work was a superhuman undertaking.

Moreover it was now beginning to be realized that Indian troops might be called on to fight far from their frontiers alongside the British Expeditionary Force ; when to have different systems of administration in force must

lead to difficulties. Proposals for co-ordinating British and Indian methods were the subject of lengthy and recurrent discussion, but matters were allowed to drift and nothing resulted. The great stumbling-block in the way of amalgamating the two Ordnance Departments was that the War Office could never agree with the conditions of service or pay India was prepared to offer. The A.O.D. had been entirely reorganized in the 'nineties. It was vigorous and the young officer highly paid. The I.O.D. on the other hand, still dealing with little beyond munitions, was not represented in commands by the Quartermaster General's, or indeed by any branch of the staff. The Indian Ordnance Officer administered an area greater than the United Kingdom. It was extremely difficult for him to establish personal relations with all the troops he served. Owing to the immensely intricate and meticulous regulations with which India was saddled, he had small chance of displaying initiative.¹ It needed great energy of character to get out of the beaten track; and the climate of India does not conduce to energy.

The Arsenals were very poorly found, and methods of procedure cumbersome. There was no engineering establishment, Inspectors of Ordnance Machinery and armament artificers being borrowed from the War Office. Properly equipped workshops cannot be said to have existed, they contained nothing but a few very primitive machine-tools, the native artisan following the methods of his forebears from time immemorial, and using his toes as tool-holders.

¹ This resulted from power, from Simla downwards, being very largely in the hands of the permanent staff of native officials; the Babu delighting in the niceties of the law, with its quibbles and precedents. In this connection an incident I witnessed in 1921, when on a financial mission to India, is worth mention. On arrival at Simla I found the Mall covered with a cloud of smoke and the roadway strewn with scorched pieces of paper. General Holman, D.Q.M.G., it seemed, had just arrived from winter quarters at Delhi, and was making a determined effort to get rid of the mass of files containing precedents by a wholesale and indiscriminate destruction of headquarter records. He also made an order that no minute was ever to be written between branches of the Q.M.G.'s side of the Indian War Office, everything was to be settled verbally.

One other point must be mentioned. Except at its own factories, India had no inspection staff. The Factory and Arsenal officers did not interchange duties. Many of its supplies India got from home where they were examined at Woolwich, and the size of the country would have made centralized delivery and inspection very difficult for native products. Articles supplied by Government and obtained in the country were sent direct to the Arsenals and examined by their unskilled staff. The canvas of tentage would be tested by the simple process of counting the number of warps and wefts to the inch, there was no expert capable of gauging the staple of the cotton. Domestic utensils and furniture—bazaar stores—differed in pattern according to the locality where they were got, and were usually of poor quality. When it is borne in mind that the commercial integrity of the Oriental is on a much lower plane than that of the European, it will be realized that India was apt not to get the best value for its money.

Thus whenever the question of amalgamating the A.O.D. and I.O.D. came to the fore, it was found that the former had nothing to gain and much to lose by the process unless India was ready to spend money freely in setting its house in order. The last attempt actually occurred in 1914 when a Committee was formed of officers of the two services, with financial members of the India and War Office, to thoroughly investigate the whole matter. This was more promising, but before the Committee had time to do more than conduct a preliminary survey at home the calamity of the Great War was upon us.

The truth is that the winds which periodically swept, cleansed and invigorated Pall Mall and Whitehall between the Crimean War and the Great War only reached India as flaws of air barely strong enough to stir its slumbers. The first duty of the army was to be prepared to deal with trouble on its own frontiers. Money was always hard to come by, and views hardly extended beyond this limited horizon. Even Kitchener, though he did arouse Indian army administration from sleep, was unable

sufficiently to overcome the inertia of Simla to perfect his plans. For this Indian bureaucratic methods were largely responsible though the Home Government, which always enjoined the strictest economy, cannot be absolved from blame.

The divergencies that existed between the British and Indian Ordnance services by 1914 can be summarized as follows :—

(1) For British troops the cognate subjects dealt with by the A.O.D. were spread over the Indian Ordnance, Supply, Transport and Military Works Departments.

(2) Native regiments still found their own clothing except full dress, their own necessities and much of their equipment, all on a monetary basis. Native cavalry indeed, except for three regiments of Madras, furnished everything they might need over and beyond their bare carbines and ammunition, even to their swords ; just as did the British cavalry of the eighteenth century.

(3) The I.O.D. was still governed by its own Director General at the Indian War Office, just as in the last century the A.O.D. was subject to a Director of Artillery. A large part of its energies were devoted to manufacturing work and, outside of Simla, it was only represented by its own departmental officers.

(4) It possessed no enlisted personnel except a few warrant and senior non-commissioned officers transferred from the artillery ; nothing corresponding to the Army Ordnance Corps.

(5) It had no specially qualified officers to examine guns and ammunition in the field ; nor any technical staff to inspect what it purchased in India.

(6) There was much disparity in the patterns of equipment used in the Indian and British services ; the differences being often such as to make interchange between the two impossible, even for items of primary importance such as rifles.

(7) Substantial reserves such as those so carefully built up at home after the South African War did not exist.

(8) In one departmental improvement, on the other hand, India certainly led the way. Its Arsenals were divided into groups, the range of duties covered by each group being the same at every Arsenal. This was a plan we found it necessary to adopt at an early stage of the Great War.

Such, then, was the position at the outbreak of the Great War. The Indian system was promptly discarded for the contingents that came to Europe ; it was obviously out of the question for regiments to buy their own clothes while serving in France, and equally out of the question to have two different systems working side by side. But in Mesopotamia, comparatively near its own base, India had to work out its own salvation, and there it met its Crimea ; with similar scandals due to hospital mismanagement, and shoddy goods furnished by unscrupulous contractors¹ ; the same confusion, with gap or overlap between the functions of the various supply services ; the same shortage of requisites for health and comfort so specially necessary owing to the very trying climate. That the public outcry was less vocal than during the Crimean War was only due to Mesopotamia being a minor chapter in the war and because it was desirable to minimize disaster at the time. The upshot was that the War Office undertook the conduct of the campaign, sending out its own Ordnance and other Directorates to Mesopotamia to remodel their services on British lines ; a very difficult matter during the progress of active operations, but one nevertheless accomplished by degrees.

At the same time India itself at last set to work in earnest. A Ministry of Munitions was created which absorbed the Director General of Ordnance with his factories, while the Arsenals and those concerned with maintenance were placed under the Q.M.G. The

¹ I saw at Bombay in 1919 a collection of curios made by the Ordnance officer in charge of the depot. There were spoons and forks that could be bent like putty, semi-transparent blankets half of the proper size and a quarter of the proper weight ; knife-boards of which the surface was merely imitation, a coat of brown paint applied to the wood, and so on.

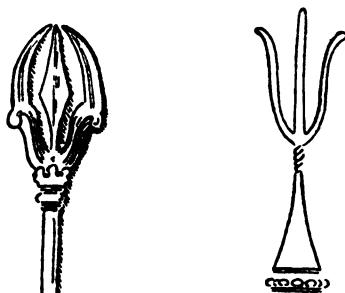
services of Sir Hugh Perry, then D.O.S. in Mesopotamia, were borrowed ; officers and companies of the home establishment were sent to India and technical staff from the Woolwich Dockyard inspection branch ; all for the purpose of building up an Indian Army Ordnance Corps whose duties should correspond with those of the R.A.O.C., though still relying on the War Office for its mechanical engineers. The officers of the I.A.O.C. under the new scheme were to be recruited from the whole army and the rank and file from the Arsenal lascars. The process was necessarily lengthy and not actually accomplished in its entirety until matters had settled down after the declaration of peace.

Then once again the question of amalgamation came to the fore, and once again the War Office was unable to acquiesce in India's proposals. Unfortunately just at this time the rupee, which had appreciated enormously compared with sterling during the war, depreciated very suddenly ; and if economy was important at home it was imperative in India. The Ordnance establishments which India proposed to maintain did not commend themselves to the home authorities as being adequate, nor did the pay it offered compare favourably with that of the R.A.O.C. ; with the result that amalgamation was once more declined by the War Office. But even if these objections could have been removed, there was a greater obstacle ahead which would have wrecked the idea. It was proposed to Indianize the I.A.O.C. and give commissions to native officers, under whom the R.A.O.C. could not be expected to serve. The two therefore still remain apart, the only members of the British Corps to serve in India being the mechanical engineering officer, armament artificer and armourer. This is unfortunate for, with the passage of years and the disappearance of the contact established during the war, methods of procedure are bound once again gradually to diverge.

CHAPTER XVII

THE BROAD ARROW



THREE articles dealing with the Trisula Symbol, in the *Journal of the Royal Asiatic Society*,¹ show that a three-pronged emblem is very ancient, that it has been used by many nations, and assumed a variety of forms; but always with some regal, priestly, or magic significance. The author of the last and most informative of these articles, Mr. William Simpson, than whom no one has investigated the subject more closely, considers it inconceivable that all the variations are disconnected and have separate origins, and in support



Trisulas of Siva.

of his argument quotes a great range of facts, a selection from which is given below.

Taking first India. That the trisula has ever been an emblem of enormous importance there is seen by its universal diffusion in all ages and in all places, and by its remarkable prominence. It caps pillars, sits on thrones, is carried aloft on standards, is impressed on coins, and adorns Buddhist temples in the richest profusion. The temples of Siva bear a trisula on the spire in the form of a trident; and that it occupies a prominent place in the worship of Vishnu is shown by the fact that it is almost invariably to be found as a sceptre in the hands of the god,

and as a mark on the forehead of the Vaishnava  

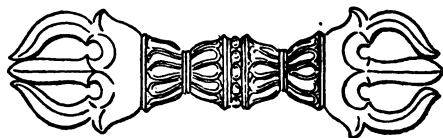
¹ Vol. XVIII, 1886, p. 364, *Early Buddhist Symbolism*—Sewell.

Vol. XIX, 1887, p. 238, *The Tri-Ratna*—Pincott.

Vol. XXII, 1890, p. 299, *The Trisula Symbol*—Simpson.

commonly in two colours, the outer portion white and the central red, the former representing Rama—male, and the latter Sita—female.

The brass sceptre of the Lamas of Tibet, an object of great veneration which is said to have flown from India, bears a trisula at either end.



Sceptre of Thibet.

The Jewish phylactery, worn on the forehead and containing a passage from Scripture, was made of leather and on its outside was inscribed the sacred Hebrew symbol Shin, the first letter of God's most holy name, Shaddai. Some Eastern Jews still wear this frontlet, so that a man from Jerusalem and another from Benares may both bear a similar mark on the forehead.



Forms of Shin.
Hebrew.



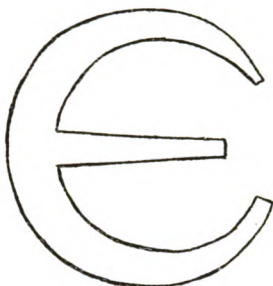
Forms of Shin.
Phoenician.

Another interesting reference to the trisula form is to be found in Plutarch, who has an essay "Of the word Ei engraven over the Gate of Apollo's Temple at Delphi" in which he explains that this was in reality formed like

epsilon ϵ the fifth letter of the Greek alphabet. He

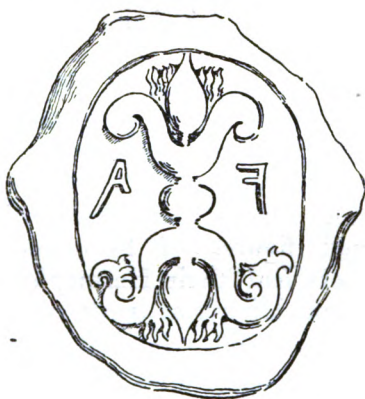
says that there was a golden one of Livia, wife of Augustus, an earlier brazen one of the Athenians, but that the most ancient was made of wood. According to Plutarch, the meaning of this emblem was not understood in his day, but he is inclined to ascribe to it the sense of permanence and immutability as attributes of Deity—a meaning

that bears a close relationship to the "I am that I am" of Jehovah of the Pentateuch.



The Ei of Delphi.

In the coins of Elis, which date about 400 B.C., the thunderbolt of Zeus appears as a double-headed trident, a form also taken by the thunderbolt of Indra.



Coin of Elis.

To convert the emblem into a presentment of forked lightning was a later idea. Thus, if the theory to be developed in the present essay that the Broad Arrow is derived from the old-world trisula symbol be accepted, it will be seen that there is a direct connection between the crest of the late Board of Ordnance "a dexter hand holding a thunderbolt all proper" and the familiar cypher belonging to that Board and its successors.

Poseidon or Neptune with his trident (borrowed by Britannia) which possessed magical powers is a well-known figure ; and Pluto, god of the underworld, bears a similar sceptre. The gods or dæmons of one age or faith become the devils or demons of another, so that it is not strange to find his Satanic Majesty usually depicted in mediæval times with a trident.

In another form the trisula appears as a combination of the solar and lunar symbols, the crescent or lunar portion being the attribute of female deities, while the central portion would be formed either by placing the orb of the sun—almost always a male deity—or else a figure representing the sun-god, within the crescent. The Turks have a crescent embracing the sun or a star, supposedly derived from Byzantine symbolism ; and Simpson also quotes instances from Egypt, such as figures of Osiris and Isis, and from Assyria and Babylonia.



Sceptre of
Charlemagne.




This conception of Deity as combining the dual creative principles of male and female, it may be noted, is common to many mythologies. Traces of it can be found among the Hindus with their combined figures of Siva and Parvati, the Greeks had their Hermaphrodites (Hermes and Aphrodite) and Dionysius is often represented with the twofold nature, while the Egyptians typified the life-giving Nile by a figure that was distinctly androgynous.

An old sceptre in the Louvre—believed to have been that of Charlemagne—bears an ivory hand with the thumb and two fingers outstretched, another strong presumption of the trisula form. The hand upheld in the Pontifical and Episcopal blessing is as on this sceptre, while that of the Eastern Church varies, the third finger and thumb being joined with the remaining three digits erect. This is the form supposed to have been used in the Western Church of Christ during the first three or

four centuries. The Jewish benediction is by two hands, but even here the manner in which the fingers are distributed and the thumbs joined bears a resemblance to the trisula. It is also a custom of the Jews to arrange the fingers of the dead to represent the letter Shin. The fact that the hand, with the fingers in the same position as in the benediction of the Latin Church, is found in small figures of the late Roman period (such as those resembling Jupiter or Serapis), shows that this was not exclusively a Christian or Jewish sign ; and lends probability to the supposition that the three fingers are but another form of a symbol associated with some high attribute of Deity.

Simpson also mentions instances where ornaments and decorative architecture bear a trisula shape, but one must be careful not to press the argument too far. The form is one that often occurs in nature, so that there would be an inevitable tendency to reproduce it in art, especially as it lends itself readily to ornamental decoration.

To these typical instances, taken from Simpson's article, may be added the following which, however, the present author puts forward with diffidence, having no pretension to be an Egyptologist.

There is an ancient Egyptian symbol  usually termed the Winged Solar Disc,¹ and a character which occurs in the famous Rosetta Stone  is also supposed to represent the Disc of the Sun emitting rays, with the meaning invested, decorated, or crowned. The Egyptian hieroglyphic  meaning "life," one of the commonest attributes of the gods, is perhaps only a variation of the Winged Solar Disc. Grasped by the ring, it is almost invariably found in the hands of Pharaohs. This symbol,

¹ A symbol which some identify with the Winged Solar Disc has been found in ancient Mexican architecture.

the Egyptian Ankh, closely resembles the mystic and sacred Tau, the crux ansata to which so many strange cabalistic properties were assigned, and which is believed to be referred to in the passages of Revelation (vii. 3, ix. 4 and xx. 4), also Ezekiel (ix. 4, 5, 6), which speak of the sealing of the servants of God on the forehead.¹

The Greek letter *tau*, which corresponds to our "t," is represented in Coptic, the language with the closest affinity to Egyptian hieroglyphics, by the character €²,

while the Greek ε equals the Phœnician א³; so that it seems to have some affinity, on the one hand, with the



Old form of Fleur-de-lis.

symbol inscribed over the temple of Delphi, and on the other with the "Shin" commonly worn on the Jewish phylactery—all being in essence trisulas, but with the points bearing in different directions.

It is also worth noting that a trisula form occurs in a number of prehistoric rock carvings where, for lack of a better explanation, it is sometimes supposed to represent the pole and walls of a tent.

The fleur-de-lis (as Simpson points out) was originally a simple trisula. It was only later that the three members were extended beneath the cross-bar and that, presumably under the influence of decorative art, the whole became highly floreated.


¹ *The Arts of Early England*—Baldwin Brown, Volume on the Ruthwell Cross, p. 85 et seq.

² *Monumental Life in Egypt*—Osburn.

³ *Histoire Ancienne des Peuples de L'Orient*—Maspero.


Now bees appear in the Arms of Charlemagne, who probably derived them from the earliest Kings of the Salian Franks, and bees were also associated with Mithra, an Eastern sun-god whose cult was widely adopted by the later Roman Empire. A common belief among the ancients was that this insect was capable of spontaneous generation from the carcase of a dead animal, hence Samson's parable—"Out of the strong came forth sweetness." In this way there has arisen a supposition that the fleur-de-lis was originally a conventionalized bee, a token representing creative power.

Finally, by this long road, we come to the Broad Arrow, the central object of this essay, whose connection with the fleur-de-lis has been often debated. While the ancestry of this cypher cannot be directly traced, it may well be derived from the most prominent, and perhaps the only, symbol definitely known to have been used by

the Druids—three diverging rods or rays  , believed

to represent the creative attribute of Deity and the origin of life and light. A collection of old Bardic writings, published under the title of *Barddas*, has a great deal to say about the meaning of this symbol and how from it sprang written language. But it all seems rather imaginative and the legends are probably tinged with later Christian doctrines.

In reality, beyond the fact of its existence, very little is known of this Druidical cypher, though the book quoted above and the following facts seem to indicate that it survived the advent of Christianity into England.

A correspondent tells me that at St. James' Church, Nayland, near Colchester, there is a late fifteenth century panel with the figure of St. Edmund Martyr who bears in his right hand this emblem  and in his left a sceptre.

After the Battle of Hoxne, so runs the story, the Danes left Edmund's headless body fastened by cords and arrows

to a tree¹; and while it is possible that this may account for the arrow-headed symbol, I am inclined to think it more probable, supposing the two to be connected, that the legend may be founded on the emblem of the Saint, which certainly in the panel bears a much closer resemblance to the Druidical cypher than to the shaft used with a bow, the central ray being lengthened to serve as a handle.

A more curious fact, given me by another correspondent, has reference to Holy Trinity Church (Goodramgate) at York, which has one of the few surviving Trinity windows with fifteenth-century glass. It appears that in both the upper and lower lights the figure of Christ is covered with marks which are said to be the signs of scourging, but which, when examined carefully by means of glasses, are seen to be, not the blood strokes which would be left by a scourge, but tiny Broad Arrows. My correspondent tells me that he was puzzled about their significance until he came across a book by an Indian author which told him that the trisula in Indian mythology was the stigma of royalty; and this he accepted as a sufficient explanation of the marks on the figure of Christ.


The symbol may also have been found as an emblem of the Plantagenet Kings and a feudal badge in heraldry. At the Battle of Barnet in 1471 the badge of Edward IV, the Sun with Rays, was so like that of the Lancastrians, the Radiant Star, that the two were mistaken for each other. This similarity makes it appear likely that both were survivals of the Celtic cypher. Whether the arrangement of the Prince of Wales' feathers is derived from the old Celtic stigma is perhaps more problematical, but it is undeniable that they have the true trisula form. It is also worth noting that the British Crown to this day contains two trisulas of different shape; one of which, it seems evident, is the fleur-de-lis, while the other, resembling three arms of a Maltese Cross, is possibly of native origin.

Once established as a royal cypher, it would be only

¹ *The Highways and Byways of East Anglia.*

a step to use the symbol as a mark for Crown property when its original significance became obscured, and the resemblance of the cypher to an arrow-head would be obvious in a country so famed for archery. This is what seems to have occurred, for the records of the City of London state that in 1386 a man was brought before the Lord Mayor and Aldermen for having gone to the houses of several brewers pretending to be an officer and a taker of ale for the King's household, and there marked several barrels of ale with a mark called 'Arrewehede,' saying that these barrels were for the household of the King, whereas in truth he was not an officer belonging to the King, but falsely received divers sums of money from the brewers that they might have the ale in peace. He admitted his guilt and was sentenced to be put upon the pillory for an hour. There is also mention, in 1598, of the Broad Arrow being used by the Collector of Customs at Newcastle as a mark for contraband goods seized by him.

The earliest trace of the Broad Arrow in connection with munitions occurs in 1553/4 when Sir Thomas Gresham, the founder of the Royal Exchange, was smuggling gunpowder into England. Writing from Antwerp to the Council he mentions "giving your Lordships to understand that I have this day received 36 barrels of gunpowder, part of the complement that was lent to the Regent, which I have shipped in an English crayer, Mr. Thomas Spacke of Lye, under this

mark  in the margin, the weight thereof you shall

receive by the ship, and for the rest as it can be made, so it shall be delivered with as much expedition as may be." And again in the next year, writing from Seville, he refers to cases marked with the "brod arrow." This would seem to indicate that the brand was used even then by the Master of Ordnance, as would be natural, seeing that he was the recognized custodian of munitions, the property of the Crown. But it was certainly not a universal Ordnance mark until later, a Royal Commission appointed in 1633 being directed to mark small-arms and

armour with the letter A and a crown—the hall-mark of the Company of Armourers of London.

It is not until the accession of Charles II that a direct connection between the Office of Ordnance and the Broad Arrow is established by the following document bearing date 1687: "The buttings and boundaries of His Majesty's Tower ground, called the old Artillery ground are as followeth. . . . Upon all which Boundary Houses his Majesty's Tower Mark, the Broad Arrow, by his late Majesty's special command hath, ever since the building thereupon, been set up."¹ At about this time the Broad Arrow was also carved on oak trees in the Forest of Dean, which were to be felled for building ships of war in the Royal Dockyards.

Next, in 1698, the symbol was legalized for the navy by Act of William and Mary; a heavy penalty being imposed for those in unlawful possession of government stores so branded. A proclamation of the following year defines the marks to be placed on stores of war belonging to the Board of Ordnance. "The King's Cypher in whose reign they were made, and the Rose and Crown on the barrels, and sometimes the Broad Arrow, also the King's Cypher and the (word) Tower on the lock-sides of all His Majesty's muskets, and only the Broad Arrow upon all other stores except cordage."

Now a Pheon, a device bearing a much closer resemblance to an arrow and with the point downwards, was a recognized charge and badge in heraldry; one borne by several noble families. Among others it pertained to the Sydneys, one of whom, afterwards Earl of Romney, was Master General of Ordnance from 1693 to 1702. Fox-Davies, a high authority on heraldry, after stating that the Broad Arrow is not a Crown badge in any degree, infers from this that "one of the Sydney family when Master of the Ordnance, to prevent disputes as to the stores for which he was responsible, marked everything with his private badge of the Broad Arrow, and

¹ Quoted in the *Journal of the Society of Army Historical Research*, Vol. I, p. 225.

this private badge has ever since remained in constant use.”

But here Fox-Davies seems guilty of the mistake of assuming *post hoc* to be *propter hoc*, for we have seen that the Broad Arrow for centuries past had been in some degree a Crown cypher, and that it was definitely a Tower mark at least from soon after the Restoration of the Monarchy in 1660. Moreover the Broad Arrow, as it has survived to this day, three lines of equal length each separated by an angle of some 30° , is very different in form from the pheon. The Act and Proclamation of 1698/9 perhaps only extended and made compulsory what was already a recognized custom ; though the fact that a Sydney was at the time Master of Ordnance would tend to make the Broad Arrow the exclusive hall-mark of the Ordnance. However, in tracing its descent, the point is really a side issue, one of degree of kinship, for the Royal mark and that of the Sydneys no doubt come from the same common stock.



Broad Arrow as marked on Georgian Musket Plate.

The last order on the subject worth quoting reads as follows : “ 28th July, 1806. The Board having been pleased to direct that in future all descriptions of Ordnance Stores should be marked with the Broad Arrow as soon as they shall have been received as fit for His Majesty’s Service ; all Storekeepers and Deputy Storekeepers and others are desired to cause this order to be accordingly attended to, in the Department under their direction, reporting to the Board in all cases when articles are received to which the mark cannot be applied.”

From that day to this the Broad Arrow has been used to stamp or brand everything supplied by the Ordnance capable of bearing such a mark. It is not only a certificate that the article has been examined and found fit for the service, but serves also to identify government

property in case of theft, etc. When condemned for further use a second inverted Broad Arrow is superimposed above the first ✕ and the article can then be

dealt with in open market, but not otherwise. The Board of Ordnance provided for many government departments besides the War Office and Admiralty, among others for penal settlements ; and when it was desired to clothe the convict in such manner as to make him easy to identify in case of escape, the Ordnance simply daubed its stamp all over the garments it furnished, a practice only recently discontinued. Thus the strange result that what was once a regal emblem became a stigma of shame.

Now what is the genesis of these trisula forms found in so many lands from the confines of China to the west of Europe, always with some high significance ; in Buddhist and Hindu temples ; as a Brahmanical caste mark and a Jewish phylactery ; as a sceptre in the hands of priests and kings ; at the Oracle of Delphi ; as the thunderbolt of Indra and of Zeus ; as Neptune's trident and the Devil's toasting fork ; as the disc of the sun or a star within the crescent moon ; as a symbol for birth or life in hieroglyphics ; as the winged solar disc and the magic Tau ; in the position of the fingers of the hand uplifted in the Priest's benediction ; connected with the Druidical superstitions of Northern Europe ; as the fleur-de-lis of France ; as a regal emblem and heraldic badge in England ; and lastly as the Broad Arrow, the hall-mark of the Board of Ordnance.


To account for the wide diffusion of an emblem of high import is not difficult. With commerce established from time immemorial along the Egypt-Mesopotamia-India caravan route and by means of Phœnician sea traders, with the ebb and flow due to racial migrations, with the diffusion of religious systems, and with the rise and fall of the great empires of the past, it is easy to understand how such a symbol might spread and at the same time gain a new meaning in new surroundings. The likening of the fleur-de-lis to the petals of a flower or a


spear-head, of the Broad Arrow to an arrow-head, and the employment of the latter as the felon's badge of infamy show how easily the purport of a symbol may be transformed. That our Broad Arrow is unrelated to other forms seems incredible, seeing the extent to which various races are known to have borrowed each other's customs and ideas.


The writer of the first of the three articles in the *Journal of the Royal Asiatic Society* attempts to connect the trisula, often found in Buddhist monuments joined to a chakra (a wheel or fiery circle), with the sacred Egyptian scarab; the two together having some slight resemblance to a beetle. The writer of the second article annihilates the scarab theory. He points out that the chakra emblem is often disconnected from the trisula, and that there would be no sense in depicting the front claws of the insect in one building and the round body elsewhere.

Simpson who, in the third article, treats the subject from a much wider standpoint, giving examples of trisulas from many lands and religions, is inclined to ascribe its origin to a combination of solar and lunar emblems. But he puts forward this theory very tentatively, adding, "Whatever may have been the origin of the trisula, if its existence in countries so widely separated could be explained, the solution would be a most valuable contribution to our knowledge of mythology." The orb and crescent, however, are only to be found in one variety of the trisula and that by no means the most common; and though the symbol might well come to be associated with the sun and moon in some forms of mythology, this significance seems more probably an offshoot than the parent stem—the essential feature of which is three radiating lines or forks.

It so happens that Mr. Hewitt, the learned Editor of the *Journal of the Royal Asiatic Society*, in the same number of that periodical, has some comments to make that point the way to what seems a far more probable clue. He notes that the trisula bears a very strong resemblance to the ancient ideographs for a fire-stick in

Hittite, Cypriote and Cuneiform—especially in Cypriote  . In the Satapatha Brahmana, he says, the priest,

in dressing the altar for the sacrifice of the new moon, is to lay first in the centre of the altar the wood of the sacred fire. Round this he is to place three enclosing sticks in the form of a triangle. Then the priest is to set alight the base of the triangle and to lay the kindling stick (still traversing the base) across the wood which is to form the new fire, giving the following figure  ; and

he points out that in the very oldest cuneiform inscription at Telloh, the ideograph for a woman is similar  . He proceeds: "The Satapatha Brahmana

itself actually interprets the altar, on which the figure given above has been laid, as a woman, and agni (the fire) in the centre is regarded as the womb of the god. In attempting to represent the opening of this womb for the mystic birth we should get, by the opening of the triangle, a symbol very much like the trisula, and still more like the symbol for the fire-stick above referred to."

Now in any investigation of this sort the general reader now has the inestimable advantage of having at his disposal the works of Sir James Frazer. *The Golden Bough* has much to say on the subject of ritual fires, particularly in connection with the oak tree which, for some unknown reason, is more commonly struck by lightning than other sorts. For this reason the oak was worshipped as representing Zeus or Jupiter, the great god who wrought rain by means of thunder and clouds and fertilized mother earth.

Frazer quotes many cases where, even in modern times, ceremonial fires have been kindled by means of the friction of oak wood either to promote fertility or as a purification. For instance in Northumberland, as late as the last century, when a contagious disease occurred, two pieces of dried wood were rubbed together till fire was produced.

Chapter XV of *The Golden Bough*—the fire drill—is devoted to the means by which the savage makes fire and the significance to him of the operation. The method employed would seem to be world-wide, by twirling the end of a hard pointed stick in a notch formed in another stick or board of wood, until the heat generated by this friction is sufficient to kindle small dry fragments of leaf, etc. “Many savages see in this operation a resemblance to the union of the sexes and have accordingly named the pointed stick the man and the holed stick the woman.” Frazer quotes numerous instances to show that this idea entered into the ritual connected with the ceremony, which would give rise to a connection in the savage mind between fire and fecundity. The Hereros, for example, join the sticks together and worship them as ancestors, while at Rome the sacred fire had to be tended by virgins.

Of all the arts acquired by man that of making fire, after articulate speech, has been the most important. Without this discovery the human race could not have spread over the face of the globe. It led the way to other all-important arts, enabling man to fashion vessels of clay and utensils of bronze and iron ; and, by cooking, to increase his sources of food supply. Warmth was in every way vital to humanity. The beneficent rays of the sun, combined with rain from the thundercloud, brought the crops to fruition, and everything would point to a connection between heat and life, fire and fertility. Hymen is always armed with a torch. It is not to be wondered at that in Greek mythology the making of fire was a magic art wrested from the heavens ; or that the process should be surrounded by an elaborate ritual, a ceremony only to be enacted by chiefs and sorcerers. What more appropriate insignia could priest or king carry than one representing the implements associated with this esoteric and life-giving mystery ? It would be almost matter for surprise if the fire-sticks were not represented by ideographs in the earliest of written records, for hieroglyphics were either concrete expressions of an idea or pictures of an object ; for

instance, the symbol in Egypt that signifies the super-human power of gods is supposed to be derived from an axe.

Here, then, we have two related series of facts. The various meanings ascribed to the trisula in nature worship are all capable of being associated in some way with fire ; and the essential feature in the shape of the trisula is the three radiating lines, the centre of which may well represent the pointed stick and the two outer the notch in which it is spun to produce fire. When we connect these together and add that the symbol actually does bear a resemblance to the ideograph for a fire-stick in several systems of hieroglyphics, it seems probable that the common fount of all the different forms may be revealed.

Having in mind the nature of the enquiry one would hardly expect to carry the argument further than this, but it so happens that a collateral piece of evidence exists to support this view. Mention has been made of the *chakra*, a wheel or fiery circle, for whose frequent connection with the trisula in India no one has been able to account. The thunderbolt of Indra is at times described as a *chakra* (I am quoting once more from the *Journal of the Royal Asiatic Society*) and this wheel is also the weapon of Vishnu. Vishirakarma, the artificer of the gods, is said to have formed the *chakra* of Vishnu, the trisula of Siva and the thunderbolt of Indra. In Buddhist temples the trisula is often to be found above the *chakra*, the whole being mounted on a pillar or the trunk of a tree with branches and leaves. There are sacred tanks at Benares and elsewhere reputed to have been made by the wheel of Vishnu ; parallel with which is the fact that Poseidon produced the spring in the Acropolis and other wells by means of his trident. Assuming the trisula to represent the fire-sticks, it is in India more than anywhere that one might expect it to be associated with water ; for the rain of the monsoon, the very life-blood of the land, is always heralded by a succession of thunderstorms. But why should the phenomenon be connected with a wheel-like symbol and this symbol be allied to the trisula ?

Here, again, *The Golden Bough* comes to our aid. The first volume of *Balder the Beautiful*, which is devoted to the fire festivals of Europe, cites numerous instances where ceremonial fires have been made by the friction of a wheel and its axle, or by lighting a wheel steeped in pitch or surrounded by straw and trundling it down a hill; and these fires were lit expressly to get a good harvest, benefit flocks and herds, procure offspring for childless couples or for similar objects.

If then we assume the trisula to represent the process of making fire, its connection with the chakra in India is not difficult to understand; but otherwise there seems no way of accounting for the association between the two.

To sum up, if we accept this theory of the origin of the trisula, the genealogy of the whole group of symbols would seem to be as follows:

In the first place, as the parent stem, we have the fire-sticks which to the mind of primitive man produce such a seemingly miraculous result, and which he consequently regards as possessed of magical properties.

As offshoots to this primary conception we find two others: that the savage regards the marvel of the lightning and thunder as due to fire made in a similar fashion by someone more potent than himself, and that he likens the life-producing union of the sexes to the operation of making fire.

He cannot fail to notice that the annual miracle of seed-time and harvest is due to heat and rain, and thus has cogent grounds for associating fire and fertility. His dim intelligence ascribed the most beneficent processes of nature in some mysterious way to fire-sticks, he invests them with supernatural powers and, we must suppose, uses them in his magic ritual as powerful life-giving spells to increase his flocks or to promote an abundant harvest.

Next comes the dawn of religion, when man begins to realize his impotence as a magician, and invokes instead the aid of a higher order of beings; and at this stage

the fire-sticks as an emblem assume a prominent place in temples or as a sceptre in the hands of a god.

With the development of various mythologies the symbol takes different conventional forms but is always associated with creative power. It is during this period also that written records begin to appear, and we find the trisula under the guise of ideographs denoting first the fire-sticks themselves and then woman, birth, life, or the life-giving effulgence of the rays of the sun, the idea being similar.

With such an origin, it is easy to see how the trisula might be converted into the thunderbolt of Zeus on the one hand, and on the other come to represent the dual creative principle—male and female—as exemplified by the conjunction of the sun and moon.

So far we have witnessed the ascendancy of the trisula, the exaltation of two dead pieces of wood into an emblem symbolizing the highest attribute of a benign Deity ; and, as scattered traces of evidence seem to indicate, the symbol was adopted to some slight extent by the Christian church itself in its infancy. The fall from this high estate and the final degeneration of the trisula into a mere cypher remain to be traced. The first step in this direction would be reached with the appearance of great organized systems of religious belief.

Pure Buddhism, after a while, became deeply tinged with Brahmanical mysticism and the doctrine of re-incarnation. In Hindu and Buddhist countries the trisula finds a particularly appropriate home, and there it remains enshrined as an emblem of the highest import, though its intent becomes clouded over.

The religion of Islam, on the other hand, has ever set its face against images and symbols, which were abjured by its founder. Thus in the Mahomedan world, with a monotheistic creed and a mundane conception of paradise, the symbol is dispossessed of a mystic meaning. As the Crescent and Star it becomes a national emblem ; an easy transition which we see foreshadowed in the stamping of ancient coins with a trisula.

The trisula, again, ceases to have any meaning to

Christianity, which has its own sign of the Cross. Here, also, it develops into a national insignia. We find it as the royal fleur-de-lis of France, in the palaces of Rome and Florence, and in England under the guise of a sun or star with rays, or perhaps as the Prince of Wales' feathers.

Thus in Europe, as in the lands of Islam, the trisula ceases to have a mystic import ; its form only is retained and, as the last traces of its early significance disappear, this form is supposed to represent the lily in France, and the arrow-head in England.

Finally we find the symbol reduced in England from a royal badge to an empty cypher betokening the property of the Crown. That this change of status occurred only in our own country may perhaps be due to the fact that it was here alone that the trisula, as the Broad Arrow, retained or regained its pure original form of three radiating lines, so that it would be a simple brand to affix, three strokes with a chisel would suffice. In this new rôle we find it as an excise mark on barrels of the King's ale, on contraband seized by the customs' authorities and on gunpowder imported under licence. A little later it appears as a landmark on Crown property at the Tower of London ; and lastly comes the use of the Broad Arrow as a mark of munitions, the most jealously safeguarded of all Crown property, and now in the care of the Royal Army Ordnance Corps.

CHAPTER XVIII

ON THE ORIGIN AND USES OF UNIFORM

Falstaff: (his sole order after enlisting Feeble, Shadow and Wart) :
"Bardolph give the soldiers coats."

Section 1.—The Psychological Properties of Uniform.

THE Oxford Dictionary defines uniform as follows: "A distinctive dress of uniform cut, materials, and colour worn by all members of a particular naval, military, or other force to which it is recognized as properly belonging and peculiar." This covers uniform of every species, the use of which is mainly a modern custom. But I shall endeavour to show that, for the special purpose of battle, man wore some sort of distinctive and uniform costume long before there was any differentiation between soldier and civilian, and long before military tailors were dreamt of; and that it is from this ancient custom that modern military uniform is derived. When treating the subject historically a more elastic definition is needed, and for the present purpose I prefer the following:

Military uniform.—A type of dress or decoration of a distinctive and uniform character, worn for the special purpose of warfare. It will be observed that this embraces decoration as well as dress; for, as will appear in the sequel, it is impossible to ignore that function.

The account given of the British soldier's costume in earlier chapters will have sufficed to show that, apart from protection and omitting the present service dress, its outstanding features have always been bright colours, ornamental emblems, and in particular a very showy head-dress. Military uniform in fact has been employed for psychological effect, but with this difference. In its earliest aspect, the woad of the ancient Briton, the intention was objective—to demoralize the foe. In its latest the intention is subjective; uniform has become a handsome dress of which the soldier should be proud and which he should be ashamed to disgrace. Its design has been to improve the wearer's morale and stimulate him to deeds of valour. This transition of ideas,

from a dress worn as a menace to one worn as a source of inspiration, is decidedly curious. At first sight there would appear to be no connection between the two which seem as opposed as the poles. But if we consider certain other factors as well, we shall find not only that there is an intimate association between them, but that uniform in its genesis may have been nothing but a manifestation of the most primitive and universal of instincts, that of self-preservation.

There can, I suppose, be few species in the animal world, let alone the vegetable, where outward appearance has not been modified by natural selection so as to afford protection. Concealment by blends of colour to match the surroundings or disguise by actual mimicry is the object usually achieved, though a conspicuous appearance may serve as a warning. Works on natural history teem with examples of the elaborate apparatus often provided as a purely adventitious aid in the battle of life. Concealment and menace may be combined. The mantis is inconspicuous and motionless until aroused to action, when it strikes what Fabre calls its "spectral attitude" and displays brightly coloured portions of the body; and this combination occurs in many of the higher animals. Their colouration enables them to escape the notice of enemies or prey, but if attacked they assume a ferocious aspect. The dog growls, bristles his crest, shows his fangs and crouches; and as he does this long before he is near enough to spring at his antagonist's throat, it must be assumed that these actions are intended to strike dismay.

It would be strange if this instinct were deficient in man, and that it is not lacking seems abundantly clear. It is common to read of people stamping and howling with rage, of scowls, snarls and shrieks of despair, of the features being contorted by passion, or of the hair standing on end with fright.

"But when the blast of war blows in our ears,
Then imitate the action of the tiger;
Stiffen the sinews, summon up the blood,
Disguise fair nature with hard favour'd rage;

Then lend the eye a terrible aspect ;
 Let it pry through the portage of the head
 Like the brass cannon ; let the brow o'erwhelm it
 As fearfully as doth a galled rock
 O'erhang and jutty his confounded base,
 Swill'd with the wide and wasteful ocean.
 Now set the teeth and stretch the nostrils wide,
 Hold hard the breath and bend up every spirit
 To his full height."

Henry V.

Long before man developed the power of articulate speech he must have been capable of expressing his emotions by sounds and gestures ; as the lion roars and the elephant trumpets, so would he bellow his defiance, gnashing his teeth and flourishing his arms to make himself appear the more formidable. It is to these three instinctive actions then, the assumption of a threatening aspect and pose, and the utterance of a fierce cry, that the fighting equipment of the savage—war-paint, war-dance, and war-cry—may, with a fair degree of probability, be presumed to owe its origin.

It remains to be seen how the effect on the adversary may have developed into one on the individual himself. Though there may be no clear line of demarcation between instinct and reason, the essential difference between the two is that, whereas in the former effect follows cause automatically, in the latter conscious thought plays its part. An act which is instinctively performed, therefore, tends to survive even if it produces a different result, or none at all. A typical example is that strange feeling, when suddenly startled, that the hair is standing on end. Originally the crest of the human scalp must have been actually erected in the presence of danger, but now (except with certain abnormal persons) the muscles that give rise to the phenomenon are so atrophied that nothing survives but a sensation. The intention of frowning would be to shut out light when concentrating the gaze on some material object. Now we frown when bringing the mind to bear on a mental problem.¹ Cases of instinct

¹ This subject is dealt with generally in Darwin's book, *The Expression of the Emotions in Man and Animals*.

being modified are very common. Natural selection, while it cannot originate, will seize hold of any material it finds and adapt it to its ends.

Assuming, then, that they were at first blindly instinctive, there is no reason why actions performed by man to scare his enemy should not end by making him feel more valiant. The transition of ideas would be very natural, both would be of service in the struggle for existence. Indeed who can tell whether this development may not have taken place in other species that use this means of defence? Who can say whether the dog may not feel braver when he bristles his crest and growls, or whether a flock of sheep could muster up courage to face a yelping cur unless they stamped their feet? The interaction between mind and body must be very complex. Does a lion lash its tail because it is angry, or does the lashing make it so? Does a child cry because it is sorry, or is it sorry as a result of crying?

I next turn to the time when, at the dawn of the human era, reason begins to challenge instinct as the governing factor in man's life. At this stage, it must be supposed, he begins obscurely to associate these actions with the idea of warfare, and seeks by every means to make himself look more ferocious. He twines and plasters his locks into some fantastic shape, decorating them with feathers, and daubs his face with any pigment he may chance upon, so as to appear more fearsome. Thus attired he stamps his feet, and brandishes his primitive weapons, to the accompaniment of blood-curdling yells (hair-raising would be an even more appropriate epithet), on any occasion of battle.

To the mind of the savage the universe is ruled by magic, good or evil, and his life is largely occupied in working magic for his own advantage. At this stage no doubt the paint, dance and sound which nature has taught men to use are largely employed as a war ritual. Among the Thompson Indians of British Columbia, when the men were on the warpath, the women performed dances at frequent intervals to ensure the success of the

expedition. They painted their faces red, sang and flourished weapons, praying to them so as to assist their mankind. In a tribe on the Gold Coast, the wives of the men who were away at war painted themselves white and adorned themselves with beads and charms.¹

These are clearly cases of magic; for neither the men themselves, nor their enemies, could see or hear what the women were doing. The paint has become symbolic of war, and is employed to secure victory. If defeated, the man believes that the result is due to a more potent ceremony performed by his enemy, or to the misbehaviour of his womenfolk, who are apt to fare badly at his hands on such occasions.

This is the stage at present reached by the tribes of Central Australia, a large part of whose time is occupied in dressing up for and performing magical ceremonies.²

It is at this period of development presumably that man begins to appreciate the ravaging effect of the lightning flash with its accompanying thunder, the loudest sound he knows. The wild beast roars, and is also destructive, so he associates the production of noise with the power of destruction. The savage firmly believes that by mimicking the sound he can produce a like result, and he proceeds to imitate the roll of thunder by beating his tom-tom so as to encompass the destruction of his enemy.

These examples illustrate the second stage. The acts originally performed instinctively to scare the enemy are now also carried out as magical rites.

The final stage is reached when their performance becomes a stimulus. Instinct, confirmed by a belief in magic, has taught the savage to employ war-paint, etc., and he comes to experience a feeling of exaltation from their use.

Bruce, the African explorer, in the year 1769, describes the Abyssinian trumpet as an instrument with only one note, which is loud and hoarse and terrible in tone. When on a march, or before an enemy appears in sight, the instrument is played slowly, but afterwards the note is

¹ *The Golden Bough*—Sir James Frazer.

² See *The Native Tribes of Central Australia*—Spencer and Gillen.

repeated very quickly and with great violence, and has the effect upon the Abyssinian soldiers of transporting them absolutely to frenzy and madness, and of making them so regardless of life as to throw themselves into the midst of the enemy with great gallantry. The Abyssinians are a Semitic race, and it may be conjectured that the Old Testament description of the fall of Jericho is merely an allegorical way of expressing the effect of the trumpet, accompanied by shouting, upon the horde of Israelites that overran Canaan under Joshua.

But we can find an example much nearer home. Froissart, describing the horrors of the martial music used by the Scots to keep themselves in spirits and dismay their antagonists, says that when the Bishop of Durham with his men approached to attack, they blew their pipes and beat their drums as if all the devils in Hell had been among them, so that they who knew not their custom were afraid. Each time the Bishop advanced they let loose this pandemonium, until at last he desisted ; but whether on account of the infernal din or not Froissart does not relate.

Capt. King, who witnessed a Zulu war-dance in the early part of the last century, describes how the performers worked themselves up into an orgiastic frenzy. They "shook their gleaming assegais in the air, and jerked their supple frames to and fro, lifting their feet alternately, or jumping with both, as they sung in perfect harmony a wild air, swelling from a low organ-like hum to the full power of their lungs, hissing like serpents and creeping with bent bodies round and round, and in and out, as if on the spoor of an enemy ; then, breaking into cries and yells, stabbing furiously at the imaginary victim in the centre, and shaking their bodies backwards and forwards with the knees upwards, until the perspiration streamed from every pore. Each verse of the war-song, which was an improvised commemoration of their late achievements, was given by a single voice in a loud recitative and then caught up by the whole in an astounding chorus :

"Come on, come on, you Kaffirs,
We will kill you, we will kill you."¹

¹ Graham's *Military Ends and Moral Means*.

It would be easy to multiply these examples, culled from America, Africa, Australia and Europe, but to show how universal such customs have been, two more, this time from Asia, will be quoted. An account of the Khonds of Ganjam and Cuttack, an ancient pre-Aryan race of India, reads as follows : " From the earliest years they are trained in the profession of arms. . . . They carefully trim their hair, plaiting it in a flat circle on the right side of the head, where it is fastened with an iron pin, and adorned with peacock's feathers or cock's tail's plumes and bound with a scarlet cloth. . . . Sometimes champions from either side perform war dances till they are sufficiently excited to come to blows. They advance with blowing of horns and beating of drums " ; and a description of the Bhutanese, a tribe of Mongolian stock living north-east of India, published in 1774, says that " when they go to war . . . they whoop and howl to encourage each other and intimidate the enemy."¹

It must not be supposed, however, that there is any line of demarcation between these stages ; all blend together, and the whole is a process of gradual evolution. The effect on the adversary remains, but is supplemented by the effect on the man himself, while both are intensified by the belief in magic. The original instinct still survives, but it is strengthened and confirmed. The savage begins to find inspiration by beating his drum, sounding his trumpet, or swinging his bull-roarer. His enemy hears, and by an opposite process of reasoning, his heart is filled with foreboding. Yet the sound is precisely the same, and whether its effect is stimulating or the reverse depends entirely upon whether the ear interprets it as friendly or hostile. In a more advanced state of civilization the band is played to cheer the spirits of the soldier, and this is simply a development of the same idea. If the sound should reach the foe, it would perhaps appear to him as ominous ; but the ear has come to receive military music in a friendly sense. It is a more modern development, and that of the enemy is seldom heard.

¹ *Indian and Oriental Armour*—Lord Egerton of Tatton.

A striking example of how the same martial air may inspire one side and again the other occurred at the storming of Famars in 1793. The old 14th, now the West Yorkshires, were in such bad case that there seemed no alternative but annihilation or surrender. The French band was playing the "Ça ira," that march of terrible revolutionary fervour. With a flash of inspiration the Colonel of the 14th saw a way out of his extremity. He ordered his band to strike up the "Ça ira" and shouted "Come on, lads, we'll beat them to their own damned tune." The regiment came out of the battle a victory and a march to the good; for, in recognition of its valour, it was authorized to use the "Ça ira" as a march.

But the opposite effects of sound are best exemplified by the war-cry used in the hand-to-hand fight, both as a menace and a stimulus. In accounts of battle, how often do we read of the savage cries of the enemy, or the triumphant shouts of our own troops as they charge to the assault. Yet the sound made by both is no doubt the same, and whether it is recognized as vindictive or exultant depends solely upon our interpretation. A book on the art of War of the year 1619 says that "All souldiers entering into battle, assault, skirmishe, or other action of arms shall have for their common crie and word 'St. George, St. George forward,' or 'Upon them St. George,' whereby the souldier is much comforted and the enemy dismaide by calling to mind the auncient valour of England, which with that name hath beene so often victorious; therefore he that shall maliciously omit it, shall be severely punished for his obstinacie." Whilst the invocation to St. George may have helped to comfort the soldier, it is to be doubted whether it was not the sound rather than the name of the Saint that dismayed the enemy. Wolfe's instructions for the 20th Regiment (in case the French land), dated at Canterbury in 1755, read as follows: "The battalion is not to halloo or cry out upon any account whatsoever, although the rest of the troops should do it, until they are ordered to charge with their bayonets; in that case, and when they are

upon a point of rushing upon the enemy, the battalion may give a war-like shout and run in." Wellington, however, looked on the practice with disfavour. Cold and aristocratic, he once checked his troops when they were disposed to shout. "No cheering, my lads, but forward and complete your Victory."

Nevertheless our modern infantry training instructions, down to the year 1914, directed that "during the delivery of the assault on the enemy's position the men will cheer, bugles be sounded and the pipes played." It is only in the edition published since the war that this is omitted.

The roll of the drum, originally an imitation of the roll of thunder, the tramp of feet in unison, and the thunder of hoofs which we hear,¹ are usually produced by our own side and are thus attractive, creating a sense of elation. The thunder itself, on the other hand, is destructive, and therefore feared, especially by children who are more guided by instinct than their elders; whilst the sound of a footstep in the still watches of the night instinctively arouses the sense of fear and the tramp of a hostile mob can sound very sinister.

So much is the feeling instinctive that cause and effect are capable of transposition. A plunge into cold water is sufficiently invigorating to make many men sing and shout in their morning tub, whilst it is common to hear of howls being produced by rage. The action in fact is similar to that of the electric machine, where the magnet either attracts or repels according to the direction of flow of the current, and where the motor can be transformed into a dynamo or vice-versa.

To recapitulate, it would appear that the human voice was first employed, when fighting, as a threat. Later on, mankind made use of mechanical appliances to produce sound for the same purpose. As, however, he heard his own voice and instruments more than those of his enemy, the instinct gradually became modified, and while the sounds still resulted in fear, if produced by an opponent,

¹ "Quadrupedante putrem sonitu quatit ungula campum"—as Vergil onomatopœically puts it. Homer has a similar passage imitating the cheerful clatter of mule hoofs.

they created a sense of exhilaration if made by himself and his comrades. The same noise was capable of producing either sensation, the result depending solely upon whether it was recognized by the ear as friendly or the reverse.

The war-dance has doubtless followed a similar line of development. First intended to frighten the enemy, it came to be performed as a rite ; and so in time became a means whereby man worked himself into a frenzy so as to screw up his courage to a sufficient pitch to attack his antagonist, or maybe to revel in imagination in an orgy of destruction. In the war-dance, motions are commonly performed in unison, evidently to give them cumulative effect, and it is likely that this may be the origin of drill¹ ; just as it is from the war-dance probably that we derive in part our sense of rhythm, for, apart from the blare of trumpets, the essential feature of the military march is its marked rhythm beaten out by the drum, originally

¹ "Before they" (of New Zealand) "begin the onset they join in a war song, to which they all keep the exactest time, and soon raise their passions to a degree of frantic fury."—Capt. Cook's third voyage, Feb., 1777.

A few examples of synchronized movements in the insect world that I have come across may be worth quoting.

J. H. Fabre writes of the cabbage butterfly: "Then, at intervals, all the heads in the row are briskly lifted and as briskly lowered, time after time, with an automatic precision worthy of a Prussian drill-ground. Can it be their method of intimidating an always possible aggressor? Can it be a manifestation of gaiety, when the wanton sun warms their full paunches?"

Robert Shelford, in his book, *A Naturalist in Borneo*, describes how the light of a large congregation of fire-flies pulsed in a regular synchronous rhythm. The passage proceeds: "This concerted action of thousands of insects is very remarkable and not easy of explanation. Another instance of it was mentioned by Cox ; certain ants that are found very frequently proceeding in columns along the floor of the jungle, when alarmed, knock their heads against the leaves or dead sticks which they happen to be traversing ; every member of the community makes the necessary movement at the same time, and as the movements are rapid, a distinct loud rattling sound is produced. In this case the action is probably a danger signal, and we can understand—theoretically at any rate—how it was brought about."

the tom-tom of the savage. The most magical of all music in a martial sense is the skirl of the pipes ; a barbaric instrument to the ear of the musician, as it is not strictly attuned to the modern scale. Yet the clamorous insistence of the drones and the yell of its chanter, stir the blood of the most sluggish and unmusical as naught else can. The emotions aroused by martial music are as different from those awakened by dance-music, as are the latter from the effect produced by a dirge.

It is to be inferred, by analogy, that the modern uniform has developed from war-paint in the same manner. Whether it appeared handsome or awesome came in time to depend upon whether it was worn by his own tribe or by another. The effect produced depended upon the interpretation of the eye and the association of ideas. War-paint, although grotesque in our eyes, would become an object of pride to its wearer. The warrior of repute is an important member of the tribe, and most frequently a very elaborate ceremony of initiation is performed by the youth on attaining maturity, before he is admitted into the warrior's caste. Sometimes the rites he has to undergo are very painful, so as to prove his valour, and are kept secret from the women and children. All these factors would combine to make man proud of his fighting dress, and the further fact that it served to frighten his opponent would cause him to find inspiration in battle from its use.

But while the history of the war-cry is not difficult to follow, it must be confessed that the connection between modern uniform and war-paint is not so apparent, and the reason for this is not far to seek. Mere noise, as distinct from music and song, has probably always been associated with battle and destruction, whereas man has adorned his person for many occasions besides that of warfare ; moreover, the soldier's uniform has come to serve so many other purposes that its original intent has been lost sight of. In fact the instinct to employ it to terrorize has been modified almost out of recognition.

To borrow an analogy from music, the process of

development may be compared to that of the principal motif of Beethoven's Fifth Symphony. At first threatening and ominous, this is ushered in, plain and unadorned, by the opening bars ; and, despite the fact that other more graceful themes are later superimposed, it underlies the whole of the first movement. In the second it is lost, only to re-appear again in a different form and tempo in the third, and again as an interlude in another key in the final movement. A close insight into the music is needed to enable one to realize that the whole of this great masterpiece is founded on this one simple phrase ; for while the original motif has been aptly described as fate knocking at the door, it finally emerges in the very different character of a sweetly plaintive melody, admirable for its beauty, and with only the faintest trace of menace. Similarly the student may discern, in the fabric of the soldier's uniform, lingering traces of its earliest crude design interwoven with later and more graceful patterns.

We will now examine in greater detail how it has come about that the warrior has been decked in trappings borrowed from prehistoric man, even in this essentially practical and prosaic century, ill-suited though they were in his occupation. It is long since such lendings were discarded in the workaday world in favour of fustian.

In the first place it must be noted that among savages it is mainly the face that is painted, and it is this portion of the body alone that is furnished with muscles which enable the appearance to be changed. Even in modern times it has been the soldier's head-dress that received the greatest amount of sartorial attention. Perhaps the last remnant of war-paint in Europe is to be found in the masks with which children delight to make themselves look grotesque, and which undoubtedly do inspire an instinctive fear in other children. Such evidence is by no means trivial, for it is often in such childish practices that the remains of ancient habits are to be found.

Not a few of our customs are survivals of the superstitions of the savage, many of these being connected

with that strange practice known as totemism, prevalent in so many widely dispersed parts of the world. Whilst totems are sometimes individual or sexual, they are usually held in common by a whole group of men who associate together and form a clan. Among the many curious customs derived from this practice is that of wearing the totem or some symbol representing it.

The relation between the clan and its totem being one of mutual assistance and protection, it would be of special importance in war and must have greatly influenced the fighting costume of numerous races.¹ For example, "In going to battle the Minnitarees dress in wolf-skins, the skin with the tail attached hangs down the back, the man's head is inserted in a hole in the skin and the wolf's head hangs down on his breast." "Condor clans in Peru, who believed themselves descended from the condor, adorned themselves with the feathers of the bird."

In the Torres Straits "every year, when the north-west monsoon was blowing, the men danced totem dances and sang, the men of the hammer-headed shark on one side, and the men of the crocodile on the other, all of them painted with red paint and wearing coronets of feathers on their heads, but the feathers of the hammer-shark men were white, while the feathers of the crocodile men were black. The very same songs were sung by the men when they were going out to war. They danced and sang in all their war-like accoutrements, the men of the hammer-headed shark in one long file, and the men of the crocodile in another, while the black and white plumage on their heads nodded to the wind. A few men danced in the third row for the sea-snake."

Sometimes conventional designs of dots, circles, etc., intended to represent the totem, are employed and these serve as tribal badges. "The clansman also affixes his totem mark as a signature to treaties and other documents, and paints or carves it on his weapons, huts, canoes, etc.," and it is frequently represented on shields, helmets and standards.

¹ The quotations which follow are from *Totemism and Exogamy*—Sir J. Frazer.

These instances will suffice to show how commonly totemism has resulted in the warriors of each clan or company wearing a uniform style of decoration, often no doubt with an extra degree of ornamentation for the chiefs; but not uncommonly an animal is represented in the war-dress so as to associate the man with its qualities, apart from totemism. "Some Bechuanas wear a ferret as a charm, because, being tenacious of life, it will make them difficult to kill." "Others wear the hair of a hornless ox among their own hair, and the skin of a frog in their mantle because the frog is slippery and the ox, having no horns, is hard to catch."¹

Herodotus relates that the Scythian drank the blood of the first enemy he overthrew. He then skinned him and used the skin as a napkin, hanging it on his horse's bridle; and whoever had the most skins was accounted the most valiant. Many made cloaks of these human skins, sewing several together; and having flayed the right hand of a foe, they used this, with the nails, as a covering for their quiver. Sometimes a human skin was stretched on wood and carried about on horseback, and the skulls of very particular enemies were employed as drinking-cups. It is evident that the intention was to identify the man with the warrior he had overcome, so as to acquire his valour and to make his arrows more accurate in flight and more deadly in effect. The custom finds its analogy in America where the Indian wore the scalps of those he had killed, and cannibalism had not uncommonly been practised as a rite for the same purpose.²

¹ *The Golden Bough*.

² "Before the time of their becoming subject to the dominion of the grand Khan, these people [of Yun-nan] were addicted to the following brutal custom. When any stranger of superior quality, who united personal beauty with distinguished valour, happened to take up his abode at the house of one of them, he was murdered during the night; not for the sake of his money, but in order that the spirit of the deceased, endowed with his accomplishments and intelligence, might remain with the family, and that through the efficacy of such an acquisition, all their concerns might prosper. Accordingly the individual was accounted fortunate who possessed in this manner the souls of any noble personage; and many lost their lives in consequence." *Marco Polo*, Book II, Chap. 40.

The Ancient Greeks wore helmets made of the skins of the weasel, dog, bull, fox and lion, and even after they came to be made of bronze and iron they were still described by the names of the animals from whose hides they were first constructed. The hair was left on the skin, and, to render the appearance more terrible, the teeth of the animal were often displayed snarling at the foe.¹ Later, when made of metal, they were richly embossed with sphinxes, sea-horses and other insignia. Polybius, describing some Greek helmets, says that with their plumes and other adornments they made the man seem twice his natural height. Athena, when in the character of Goddess of War, is represented as attired in an ægis (goat-skin) fringed with serpents and bearing the Gorgon's head; her helmet having the beak of a griffin, and being ornamented with sphinxes.² The Greeks, incidentally, distinguished between martial and other forms of music, the former being attributed to Minerva, as was the Pyrrhic dance, performed to commemorate victory over the giants.³

Now although one can understand the tough hides of lions and bulls being employed to protect the head, it is difficult to conceive why the skin of such a small beast as a weasel or dog should be worn, unless for the purpose

¹ With this may be compared the custom of Alaska Indians who, according to Captain Cook, decorated their face-masks with seal's teeth.

² The Greeks made great use of such warlike embellishments. A large portion of the 18th Book of the *Iliad* is devoted to a description of the armour and marvellously adorned shield furnished to Achilles, and a famous passage in Æschylus' *Seven against Thebes* describes the awe-inspiring devices of the Argive Chiefs.

"I blench at no man's blazon, fear no wound

From emblems: plumes and bells without the spear

Hurt not."

is the comment of Eteocles.

³ The Greek States had different scales which to their minds expressed different emotions, meaningless though they are to our ears. Plato banished from his ideal city dirge music and wailing melodies, the effeminate Ionic and "soft Lydian airs" used on convivial occasions. He would have only the vehement and gentle, the Phrygian which imitates the accents of a man in battle, truly brave whether in success or defeat and death, and the Doric representing calm and peace.

of identifying the wearer with this particular animal. Although the Greeks practised magic, consulted oracles and took omens before going to war, it is not known that they were totemic ; and it is thus interesting to find that Herodotus, in seeking to explain why they used to bear crests and devices on their helmets and shields, supposes the custom to have been derived from the Carians, a race which believed itself to be the aboriginal inhabitants of Greece and the Ionian Islands. In the same way he supposes the attire of Athena to have been borrowed from Libya ; and totemism is known to have been prevalent all over Africa, the Egyptians carrying devices representing animals on their banners.

The legend of Romulus and Remus being suckled by a she-wolf is akin to many fables whereby men have sought to account for their identity with their totems ; and the custom of many Roman troops of wearing a wolf's paw in their head-dress may in the same way have been totemic in origin, borrowed from some earlier race. Light unarmoured Roman soldiers frequently wore the skin of a wild beast as a head-dress, and the standards of legions bore the figures of animals or birds.

The face of the image of Jupiter in his four-horse chariot at the Capitol was regularly dyed red for festivals, and one of the first duties of the Censor was to contract for having this done. Down to Imperial times, victorious generals celebrating triumphs wore the insignia of the god, borrowed from the Capitol. They were clad in purple robes embroidered or spangled with gold, and their faces reddened with vermilion.¹ This is very significant of war-paint. It would be natural that its last remnant should be found in the image of the god after it had been discarded by man ; for religion developed from magic by the transference of supernatural power from the human magician to a higher order of beings. The adoption of the paint and symbols of Jupiter by the victorious general was to identify him with the god, and it is further noticeable that while the colour of the dress was the Imperial purple, that of the face was red, which may well

¹ *The Golden Bough.*

have been a colour associated with might and majesty at a more ancient time.

The three primary colours of the dyer are blue, yellow and red ; and the aspect of the landscape is mainly green, composed of the two former in various degrees of combination. Red being rarer in nature is more conspicuous to the eye. The proverbial attitude of the bull towards a scarlet rag is no doubt due to his being unaccustomed to seeing anything of this colour fluttering in the breeze ; and the ancient Briton had to be content with the blue of the woad simply because it was the only dye known in England, where the more brilliant colours of the tropics are absent. In more southern climes, however, where man had a greater choice of pigments, red seems to have been the favourite colour of war-paint ; white, also very conspicuous in contrast to a swarthy skin, ranking next.¹ Rouge and powder are still the principal cosmetics. Red has been a common colour for soldier's uniforms in many countries besides England, and this is a much more likely source of the origin of the British soldier's scarlet tunic than either of the suppositions quoted on p. 28, Vol. I.

In classic times the Greeks and Romans wore so much armour that it largely took the place of clothing ; but in other countries there is evidence that the soldier had a handsome uniform. Armour was seldom carried in Persia, only distinguished warriors having shirts of mail ; the main weapon of the Persians was the bow used on horseback and on foot. They trusted in mobility until defeated at Marathon by foemen who fought at close quarters in armour, and there is ample evidence that the Persian soldier was brilliantly arrayed.

The fullest account of ancient war apparel is that given by Herodotus in describing the various people comprising the armies that invaded Greece under Xerxes, each in its distinctive panoply of war. There we read of Persians in head-coverings called tiaras, Medes in mitres, Assyrians

¹ White is a common colour in the tropics for species that advertise their noxious properties as a warning. In such surroundings it is alarmingly noticeable.

in helmets of brass "twisted in a barbarous fashion not easy to be described." Bactrians are in turbans, Sacæ in caps that stand erect and come to a point, Caspians in goatskin mantles, Sarangæ conspicuous in dyed garments. Lycians are in goat-skins with caps encircled with feathers and so on, each race or tribe in its own particular head-dress or raiment.

At the time of the conquest of Mexico, the Aztecs had a centralized government and a military organization, and though their decorative architecture is by some thought to bear traces of Eastern cult, civilization here must have evolved in the main quite apart from that of the Old World. Yet we find similar customs in vogue. The leaders in their military hierarchy were distinguished by their braided hair, eagle's beaks and spotted armour. Those of rank wore helmets resembling birds and beasts of prey and armour of gold and silver. The common soldier was brilliant in savage war-paint; but for feats of arms he could reach the dignity of wearing coloured blankets, tassels and lip-jewels.¹

The celebrated red and yellow feather capes of the Sandwich Islanders were essentially a military uniform worn expressly by the chiefs in battle; and any captured from the foe were awarded to soldiers who had distinguished themselves in the fight.

Turning to another form of civilization, that of the Far East, the process of development is shown even more clearly. In Japan, armour was worn from the eleventh century until towards the end of the nineteenth; but unlike European or Saracenic armour, although there were improvements in materials and finish, there was little change in its style during the whole of this time. In more recent periods this armour is beautifully lacquered and decorated, and the art of the armourer is expressed as much in its ornamentation as in its strength. In this way it has developed on the same lines as that of the Knight, becoming an object of pride to the wearer. A peculiar feature of this armour, however, is the iron

¹ *Encyclopædia Britannica.*

mask which replaces the visor of European armour as a protection for the face. This is intentionally designed to imitate some real or imaginary monster, and is often provided with a bristling moustache under which can be seen fierce iron teeth wrought in the mouth slit. Here we see clearly the most ancient and modern aspect of the fighting dress in combination, together with the principal intermediate use, that of protection.¹

Thus in widely dispersed parts of the world we find the same result. As man emerges from a state of savagery and begins to advance in the arts of civilization, the fighting dress, originally intended to demoralize his enemy, becomes prized for its decorative properties.

Such few books as I have found to contain any reference to the subject of uniform, allude to it as an eighteenth-century innovation ; and while in the narrowest sense this may be true, for it was then that a meticulous exactitude in the soldier's dress was first established by regulations, yet in a broad sense the idea of uniform is as old as the hills. Indeed the savage, ruled as he is by magic, is the most conservative of individuals, and would discountenance very severely any novelty. What his forefathers had worn it would be incumbent on him to wear to produce a like effect ; and it would take a very strong man, and very strong reasons, to bring about any change in the style of the warrior's war-dress.

Later on, however, protection became the paramount property required of the soldier's costume ; and with the use of armour, each piece of which was of individual workmanship and extremely durable, the sense of uniformity certainly tended to disappear though not the desire for display ; but even then it was common to dress the unarmoured peasant in some sort of uniform when employed as a soldier.

¹ A full description of this armour can be found in the *Transactions of the Asiatic Society of Japan*, Vol. IX, 1881. From an account of Chinese military dress given in *Art Militaire Chinois*, 1772, its objects were evidently similar.

Still later, it chanced that armour fell into disuse in Europe at the very time when it became the custom to maintain large standing armies, and when the soldier was for the first time clad in a different style from that ordinarily worn; so that there was more distinction between him and the civilian. Thus uniform came into greater prominence; but it was really no novelty nor had its original intent been lost sight of. A description in 1605 says that "crests were used auntiently to terrifie the enemy and therefore were strange devices or figures of terrible shapes."¹ And in *Henry V*, the prologue mentions "the very casques that did affright the air at Agincourt."

The mounted grenadier was provided with a hat as well as his long-tailed fur cap, only donning the latter on the word of command to throw grenades; and its intention was evidently, as Evelyn says, to make him look fierce in the assault. Indeed it is easy to conceive that an even earlier ancestor of the modern bearskin may have been furnished with a grinning mask set with teeth. Even in 1885, the last occasion on which the red coat was worn, at the battle of Ginnis, it was donned for the effect it would have on the dervishes.

Nor is it only the soldier's uniform that has been employed for moral effect. His accoutrements have been decorated for precisely similar reasons. "By means of art, the realm of magical potentialities becomes further extended; for when the representation of a spirit protector is carved on an implement, weapon or ceremonial object, the thing itself becomes a carrier of supernatural power."² At a later stage the tendency to decorate arms and armour would be stimulated by the pride of military caste—the chivalry of Knighthood, the religious ardour of the Saracen, the Samurai spirit of Japan. Thus, whether an æsthetic sense is innate in man or developed from pride in craftsmanship (a debatable point), there can be no doubt that decorative art, like

¹ *Rem: Armouries*—Camden.

² *Early Civilization*—Goldenweiser, p. 188.

music, has gained much by being the handmaid of Bellona.

Save the helmet, no article has so commonly borne devices as the shield presented to the foe. Even the Australian carves quite elaborate conventional symbols on his shield. With the primitive tools at his disposal this must need immense time and labour and the intention is doubtless to make it invulnerable. In Scandinavia, under the laws of Gula, believed to have been established by Hacon the Good in the tenth century, every possessor of property of the value of six marks was required to provide himself with a shield two boards in thickness, which was to be coloured red¹; and according to Diodorus Siculus the Kimmerians living near the Weser had bucklers of osier or boards daubed over with glaring colours. When Isaiah writes of shields being anointed, he probably refers to a rite intended to give them protective virtue. Their shape even seems to have been associated with magic, for they were fashioned in various forms such as a crescent like the moon, or an ivy-leaf sacred to Bacchus; and such shapes do not seem specially suited for protection.

Herodotus describes a linen corselet of Amasis, King of Egypt, as having many figures of animals inwrought, and being adorned with gold and cotton-wool. Each thread of the corselet made it worthy of admiration, for although fine, it contained 360 threads, all distinct. This is a mystic number—one thread for each day in the Egyptian year, in which five days were interpolated; and these must have been to Amasis as his heel to Achilles. Another similar tunic he dedicated to Minerva at Lindus. Here, again, we see magic developing into religion. Man is discovering that he is impotent to control and compel the forces of nature, and is seeking to propitiate a higher order of beings by making votive offerings at their shrines and sanctuaries. It was a frequent practice to present specially handsome accoutrements or weapons, so as to enlist the sympathy and aid of deities associated with war. Cræsus gave a lance of solid gold, point and all, to the

¹ *Cyclopædia of Costume*—Planche.

oracle at Delphi ; and Solomon made shields and targets of gold, which he placed in the house of wonders that he constructed in the forest of Lebanon.

It is not improbable that the modern practice of presenting swords of honour to distinguished generals may be derived from such customs. But now, in a spirit of greater caution, the offerings are made as a thanksgiving after the event, in place of a propitiation beforehand.

Spears sanctified to Mars were kept in his sacrum in the house of the priestly King of the sacred rites at Rome ; and on the outbreak of war the Consul had to shake these saying "Mars Vigila." Shields sacred to Mars were also carried in procession by his dancing warrior-priests. Thus, whereas in earlier times the warriors themselves danced and brandished their arms, it is now the priests and Consul who perform the ceremonies, flourish the weapons of the god, and call on him to be watchful.

The battering ram was carved to imitate a ram's head, so as to add force to its blows. The tubes employed to throw Greek fire and some of the earlier guns were wrought in the semblance of some ferocious animal ; but doubtless owing to mechanical difficulties in casting, the representation in the latter was more commonly figured on the cascabel or engraved on the barrel. These early guns, though sometimes given the appellation of a venomous or fabulous beast, such as the serpentine or basilisk, were usually named after birds—robinet, saker, falcon, etc.—to lend wings to their projectiles.

In the early musket the arm that conveyed the burning match to the priming pan was fashioned like an animal's head. It was styled a cock in English, *hahn* in German, *chien* in French, a serpent in Spanish and Italian, and again *cao* (a dog) in Portuguese ; and one name for the musket was a dragon, which survives to this day in the word dragoon, and which has now been re-adopted in its original form for one of our latest engines of war.

It has been common for the hilts of swords to represent

an animal's head. In the Arthurian cycle of legends the brand Excalibur had magical properties, so, too, had the sword Durandal in the romances of Charlemagne. Verses of the Koran are inscribed on the Damascene blade; and even now that of the British officer bears a mystic device, though he may care little about its temper and buy it, with his uniform, from a military tailor.

The oak leaf embroidery worn by French and English generals, and which adorned the brow of Coriolanus, is doubtless derived from the worship of the oak. In what is said to be the only authentic representation of Druids, a bas-relief found at Autun, one of the two figures is crowned with a garland of oak-leaves.¹ Standards and banners, first decorated with emblems for similar reasons, are still treated with semi-religious observances.

It is, however, in connection with military music that ancient superstitious customs seem to have clung with the most tenacity. The musician has always worn a particularly resplendent uniform. Until recent times banners were hung from trumpets and other instruments, and the drum is still highly decorated. The big drummer is the last man to wear the skin of an animal, usually that of a leopard.² The uniform of the state trumpeters of the Household Cavalry in particular is a mass of gold lace, the kettle-drums, surrounded by a very lavish and costly banner, being carried by a white or conspicuously coloured horse.

¹ Figured in Planche's *Cyclopædia of Costume*.

² "Within the square of men, immediately fronting the King, the war-arms of Uganda were arranged in three ranks, the great war-drum, covered with a leopard-skin, and standing on a large carpeting of them, was placed in advance."—Speke—*Journal of the Discovery of the Sources of the Nile*, Chap. XIV.

"The King" (of Unyoro) "had been raising an army to fight Rionga—the true reason, we suspect, for the beating of the drum."—*Ibid.*, Chap. XVIII.

"The King of Kasson" (West Africa) "can raise four thousand fighting men by the sound of his war drum."—Mungo Park's *Travels in the Interior of Africa*, Chap. VII.

Even so, until recent years, regiments were regularly recruited in England by beat of drum.

By the eighteenth century uniform ceased to be worn so intentionally as a menace, though even to this day there is probably an ill-defined, though instinctive, feeling that an imposing appearance lends effect to a charge. Witchcraft and sorcery were falling into discredit in Europe, and the efficacy of magic was no longer firmly believed in. From this time onwards a handsome costume was worn on account of its effect on the man himself; either to stimulate a personal pride, to foster esprit de corps, to attract the recruit, or to instil a sense of mass discipline under the system of drill of which Frederick William of Prussia was the great exponent.

Yet there has probably never been a time when so much importance was attached to the soldier's appearance, and so little to his comfort or the exigencies of his profession. It was true that, as he wore a King's livery, it was fitting that the soldier should be smartly turned out; but the navy is also a Royal service. The sailor, however, was not primarily a fighting man and the uniform, a comparatively recent innovation, was a loose serviceable dress well fitted for his work.¹ This is more than can be said for the soldier's coat, a tight-fitting garment with a stiff collar, unsuited for either marching or fighting, and of a colour to show every speck of dirt.

At this time the colonel clothed his regiment, and made as much profit as he could out of the transaction. He employed the least possible quantity of the poorest and

¹ The practice of wearing uniform in the navy seems to have originated, mainly at all events, owing to the necessity of having a slop-shop on board ship, where the seaman could purchase such clothing as he needed. This, being provided by contract, was all made the same; but though the navy in the eighteenth century was more firmly established as a national service than the army, the wearing of this slop clothing was optional.—See the *Mariner's Mirror* for Jan., 1924.

"In particular a hundred of the most sightly of the crew were uniformly dressed in the regimentals of the marines, and were drawn up under arms on the main deck, against his" (the Viceroy of Canton's) "arrival."—Anson's *Voyage Round the World*, 1740-44, Book III, Chap. VII.

"Several of the most considerable Chinese merchants came to Mr. Anson to desire that he would let each of them have one of his soldiers (for such they styled his boat's crew from the uniformity of their dress) to guard their warehouses and dwelling houses."—*Ibid.*, Book III, Chap. X.

cheapest cloth, often unshrunk to make it go further ; so that after the first shower of rain the soldier was pinioned as in a strait-waistcoat. Yet, although it was contrary to his pecuniary interests, he introduced unauthorised lace, fringes, wings, etc.

This striving after effect, this craving for display, the craze in particular for devising new and ever more fantastic head-dresses cannot be explained as due to the fact that the soldier wore a Royal livery or to the necessity of distinguishing between regiments and Corps, especially as the decorations were so often borne in flagrant defiance of orders.

Nor has this phase been confined to England ; military manners and customs have always been more international than others. Voltaire describes the method of converting men into soldiers as dressing them in blue cloth at two shillings a yard, binding their hats with coarse white worsted, turning them to the right and left and marching them away to glory. Marshal Saxe again, the most distinguished warrior of his age, who fought all over Europe, in his *Reveries upon the Art of War* published in 1762, writes : " Our dress is not only expensive, but inconvenient, no part of it being made to answer the end required ; the love of appearance prevails over the regard for health, which is one of the grand points demanding our attention."

If the time and labour expended over such details had been devoted to the provision of workman-like garments of good quality, if even a tithe of the pains taken to devise elaborate head-wear had been spent on providing suitable foot-wear, we should not have heard so much of the sufferings of the soldier in the Crimean War, due to his poor and inadequate clothing ; and especially owing to the wretched quality of his boots, which were utterly unfitted for wear in the trenches during the cold and wet weather.

Next to questions affecting pay, no subject gave rise to so much discontent among the troops as clothing, both on account of its poor quality and insufficient quantity ; and of the time, labour and expense to which the soldier was put to turn himself out to the satisfaction

of his officers. Military coiffure in particular became an absurd craze. We may read with amusement of the Australian savage spending hours in dressing his head for a corroborree ; but Macaulay's *New Zealander*, studying such an account alongside of the meticulous orders on hair-dressing framed by the Duke of Kent when Governor of Gibraltar (they can be read in the *Journal of the Society of Army Historical Research*), will find little to distinguish between the two and may well wonder what was the totem of the House of Guelph.

Cleanliness and a pride in personal appearance are certainly qualities to be cultivated by everyone, soldier or civilian ; but although the former is said to be next to godliness, we do not specially associate it with the clergy, whereas "smart and soldierlike" are epithets constantly coupled together.

Put crudely and baldly, it was the custom in the past to take the unemployable wastrel, often of weak or bad character, a drunkard or criminally minded, and dress him up in finery ; taking it for granted that this would tend to make him patriotic, brave and stout-hearted. It was always assumed as a matter of course, and no doubt with truth, that a smart uniform should have this effect ; just as it was assumed that the bugle and cheer enjoined by the drill book would brace the soldier for the assault. But there must be some reason to account for these phenomena ; and this can only be furnished by supposing that all three owe their origin to the menacing aspect, gesture and howl by which the savage seeks to intimidate his foe ; and that it is instinctive in man, as in many of the brute beasts, to employ such adventitious aids when fighting.

If it be asked why these means have been less commonly employed in recent years, the answer is evidently that this is due to the adoption of new forms of warfare. With rifles and guns dealing destruction at ranges unknown to our ancestors, concealment has become of paramount importance. Wellington mentions that at Waterloo the only reason why he could not distinguish

Napoleon was because the day was dark, with rain in the air ; but even so he could recognize Soult quite plainly through his glass and saw him write a letter. With the Generalissimos so near to each other, it could be no advantage to the private to have an inconspicuous dress ; but now that the scarlet coat is a source of danger, the soldier ceases to delight in it when fighting. With modern long-range fire he feels safer, and therefore fights better, in service dress.

In the same way the sound of music would indicate the presence of troops, and draw the enemy's fire. Of recent years, the band has been employed only in peace, and the bandsmen have become stretcher bearers on service ; but during the Great War the necessity of music to enliven the march and afford entertainment when the troops were out of the trenches was soon felt, and they were re-constituted.

The war-cry is only a stimulus to hot blood. The man behind the gun engaged in deliberate fire finds no inspiration from its use, yet it was still employed in the hand-to-hand work of assault on trenches in the Great War, no doubt instinctively. The East Surreys used to dribble a football when they went over the top ; the idea is the same—to keep up the men's spirits.

Many have pressed for the re-introduction of full-dress uniform on account of tradition and the association of ideas which connects a handsome costume with the profession of arms, the origin of which I have endeavoured to trace ; but this has only been sanctioned for His Majesty's Guards and the regimental band. There had been some who viewed with disfavour the adoption of a drab uniform on service for similar reasons¹ ; and possibly

¹ Col. "Boots" Wallace who commanded the Brigade of Artillery in which I was a subaltern in 1894, and afterwards the Horse Artillery at Aldershot, a soldier of the old school, looked on the custom of wearing a loose serge jacket on parade (at that time an innovation) with the greatest disfavour, even in camp ; and the idea that khaki should come to be worn in a continental campaign would have been abhorrent to him. I well recollect, for the idea was new to me, his insisting on the importance of the soldier's fighting in his smartest uniform without which he believed that discipline on the battlefield could never be maintained.

it is chiefly the older generation who now urge that the scarlet tunic be re-introduced.

It is strange to find, side by side with the tradition of gallantry associated with the "thin red line," an equally strong tradition of abhorrence to the "red coat." It has sometimes been supposed that this originated at the time of the Commonwealth ; when the country resented being governed by major generals, and the army became unpopular owing to its overbearing interference in matters of State. But the military profession was a highly honourable one during the Protectorate and, except towards its close, the army was esteemed by the nation. If the prejudice really existed then, it probably dates back to the reign of Elizabeth, when the pressgang was first employed and the scourings of the jail, rogues and vagabonds of all sorts, were turned into soldiers by the simple process of giving them red coats. Whatever the cause of its inception, however, this tradition received ample nourishment in the eighteenth century ; when the army was recruited from the criminal and pauper classes, and when the conditions of life of the soldier were appallingly bad at home and worse abroad. Spasmodic attempts were made from time to time to improve matters, notably by Marlborough, that great army administrator ; but it seems to have been accepted as an axiom that the soldier must be recruited from the dregs of the populace. Not until after the Crimean War did the soldier's lot really improve. But traditions die hard ; it is only some thirty years since Kipling wrote :

" It's Tommy this, and Tommy that, and get away you brute !
But it's thank you, Mr. Atkins, when the guns begin to shoot."

And this tradition was alive in 1914 when soldiers in uniform were sometimes refused admittance to high-class places of entertainment ; and when in the remote country-side it was still a disgrace to a respectable couple for a son to take the King's shilling and 'list for a soldier. So much was this the case that, at the depot of the Duke of Cornwall's Light Infantry at Bodmin, the scarlet tunic was never worn in public if it could be avoided,

not even on church parade, as it hindered rather than helped recruiting.

This prejudice has never existed as regards service dress, a recent innovation ; and probably in time a new tradition will arise of the armies of the Empire in khaki, based on their glorious deeds in the Great War. But if traditions are hard to eradicate, it also takes long for them to take root. With us, whether the man becomes a soldier or adopts some other calling is a question of competition in the labour market ; and, under modern industrial conditions and with the spread of education, the red coat is less likely to prove a recruiting magnet than in the past.

Before quitting this branch of the subject, it may be well to state that it is not for one moment suggested that man has come to take a pride in adorning his person solely owing to his fighting instinct. It would be as wrong to suppose this as to infer that it is chiefly on this account that he has developed a liking for music, dance and song. There can be no doubt that decorative dress is derived very largely from sexual instinct and that the influence of sex has to be taken into account in all sartorial developments. This factor cannot be ignored when considering the tendency of uniform to pass from the menacing to the ornamental. But it would be out of place to do more than allude to this aspect, beyond noting that the stock argument of those who favour the re-adoption of the red coat is its appeal to the fair sex and consequent influence on recruiting.

The sole attempt of this essay is to trace the origin and evolution of the special fighting costume, for which purpose the war-cry and war-dance have been discussed by way of analogy.

Section 2.—The Physical Properties of Uniform.

From the physical aspect a fighting dress has been worn for two purposes ; to afford protection, and to provide a means of identification.

In the description of the Creation given in the Book of Genesis, we read that man at first led a peaceful existence in the Garden of Eden, where he wandered naked and unashamed; and that it was only as a result of his first disobedience in eating the forbidden fruit, that he realized his nakedness. The account is believed to be compiled from two sources; one of which states that Adam and Eve made themselves aprons of fig-leaves, and the other that God made them coats of skins and clothed them. But the idea of both is evidently the same, to explain how it came about that man adopted the habit, by which he was distinguished from the beasts, of wearing clothes.

It is however difficult to conceive that man would feel compunction about being in a state of nudity so long as he was unaware of any other condition; and modesty is far more probably the result of clothing the body than its cause. That it is not a quality innate in mankind seems to be proved by the fact that different races consider it indecent to expose different parts of the body; among Mahomedan women the face, in China the feet, and the finger-tips in Central Asia; while in our own country at the present time the ear is the extremity that ladies take most pains to conceal.

Neither can climate be regarded as among the first causes leading to the use of clothing. The natives of Central Australia, where they have not come in contact with white men, have no idea of its use. While they kill kangaroos and wallabies it appears never to have entered their heads to wear the furs of these animals, although the night temperature falls to several degrees below freezing for weeks on end.¹ Even in the bleak and inhospitable region of Cape Horn the natives went about unclothed. Capt. Cook in his account of his third voyage (Jan. 1777) refers to "the half animated inhabitants of Tierra del Fuego, who have not yet invention sufficient to make clothing for defending themselves from the rigour of their climate, though furnished with the

¹ *The Native Tribes of Central Australia*—Spencer and Gillen.

materials." It is to be supposed that the primitive man's integument was suited to his climatic environment.

Prehistoric man was first and foremost a hunter, ages before he learnt to domesticate wild animals, or, later still, to till the soil ; and, though there are no large ferocious animals in Australia, it is probable that our remote ancestors in other parts of the world, during the great formative period that succeeded the Ice Age, would notice with envy that many of the wild beasts they encountered had tougher hides than their own. The savage commonly dresses in an animal's skin and, though this may imply nothing, for it would be a convenient substance to use, yet if we rule out modesty and climate, it seems probable that clothing, as a covering for the body, was first worn as a protection in the chase.

It has been shown, however, that clothing has developed to some extent from war-paint in connection with totemism and other forms of magic ; and Westermarck, in his *History of the Human Marriage*, no doubt rightly ascribes its origin largely to sex. Amulets and charms, bracelets, cowrie shells and red ochre have been found in many a prehistoric grave. There is the magic girdle which man tied round his mate's waist to ensure her chastity. Tattooing, a very ancient and widespread custom, may be regarded as an extreme form of purely decorative dress.

The probability is that clothing first served as an artifice in connection with the two most potent of all instincts, preservation of life and propagation of species—as a menace in battle and a sexual lure ; and that its use as a protection when fighting wild beasts or fellow men followed later. Other factors such as migrations to cold climates would tend to make the habit take root. Savages often wear an animal's head and skin as a stalking dress, sometimes as a form of magic ; and Captain Cook, writing of Tasmania, says that while the men went naked, the women, otherwise equally so, wore a kangaroo skin on their backs to carry their babies.

Thus from one cause and another the custom would become ingrained ; modesty would make itself felt, and,

with the lapse of ages, civilized man would become so used to clothing as to be incapable of withstanding any degree of heat or cold without its protection.

Assuming the sequence of events to have been as here suggested, it will be observed that, both from the psychological and physical aspect, masculine attire was at first largely in the nature of a military uniform—a type of dress or decoration of a distinctive and uniform character worn for the special purpose of warfare.

Man must have begun to devise artificial means of protecting himself at about the same time as he learnt to supplement his claws and teeth by some kind of rude weapon; for if means of offence or defence developed, the one without the other, it is obvious that there would be an end of war; either everyone would be killed or no one would be the worse off. This battle between the two has doubtless been waged throughout the ages. No sooner is a new or improved weapon invented than means of protection follow, or vice versa; the latest developments in the Great War being the use of poison-gas, countered by the gas-mask, and the advantage of the trench, neutralized by the searching effect of the bomb and grenade which were soon revived once trench warfare developed.

A very early record of protective clothing is to be found in a sculpture nearly 5000 years old discovered in Mesopotamia, which represents Eannatum, King of Lagash, and his soldiers in conical helmets covering the brow, and carried low down the back so as to protect the neck; the King's helmet having in addition moulded pieces covering the side of the head and ears. Shields are also carried and both shield and helmet are almost certainly of leather, though the nine circular bosses on the face of the former may have been of metal.¹

Herodotus mentioned that the Egyptians were famous for their strongly quilted linen tunics which were adopted by the Persians. He also refers to the Macæ in skins of ostriches as defensive armour, to Indians in corselets of

¹ *A History of Sumer and Akkad*—L. A. King.

plaited reeds, and helmets and greaves of wood. According to Pliny the Roman soldiers had garments stuffed with wool, to which vinegar was applied to make them more resistant. The Japanese wore leather before they took to armour, and the Aztecs had greaves of wood and a quilted cotton tunic, so serviceable as a protection from arrows that the Spaniards were glad to adopt it.¹ In Virginia the natives made themselves breastplates of wood.² The Nootka Indians of Alaska had flexible coats of mail of laths bound by sinews,³ the Sandwich Islanders war-mats strong enough to resist gun-shot.⁴ The Tartars employed the thick hides of buffaloes and other beasts toughened by fire.⁵ In Europe there was the padded and quilted gambeson. In fact every warlike race seems to have used some sort of material to make itself protective clothing, either the skin of an animal, the plumage of a large bird, cotton, linen, wood, wool, hair, or wicker.

As, however, man learnt to forge copper, and later iron, these metals were employed in conjunction with other materials and gradually took their place. The extent to which armour has been worn is well known. Goliath is said to have had a coat of mail weighing 5000 shekels of brass, and Ahab was killed by a chance arrow that penetrated the joints of his armour. It was carried by Greek and Roman soldiers, in mediæval times both in Europe and by Saracenic races, and in Japan until quite recently. In fact, apart from a psychological aspect, the main design of the soldier's distinctive dress has been to protect him from the weapons of his enemies.

After being worn with this object for countless centuries armoured clothing ceased to be of use as soon as the fire-arm, whose projectile it was powerless to resist,

¹ Article on Mexico—*Encyclopædia Britannica*.

² Amadas and Barlow's *Voyage*, 1584—Hakluyt Papers.

³ Cook's *Third Voyage*.

⁴ *Ibid.* It was this that cost him his life. For the sake of humanity he refused to allow muskets loaded with ball to be used when first attacked.

⁵ *Marco Polo*, Book I, Chap. 48.

became the predominant weapon ; its last survival being the cavalryman's buff coat and jack-boots which served to protect him from a sword thrust. Thus, first and last, armour was made from the skin of an animal.

The next form of protection is that adopted for the purpose of a campaign in an unaccustomed climate ; and this is no doubt of more recent origin, for the savage does not wander far from home. The earliest example in England is the white surcoat worn by the Crusaders in Palestine, modern developments being the light drill clothing and sun-helmets of the tropics, and the knee-boots, fur caps and gloves of our troops in Canada.

The third and last use of uniform as a protection has been with a view to concealment ; and it is strange that, while in the animal world appearance is so generally and wonderfully adapted to this purpose, it has apparently only occurred to man in quite recent years to design his uniform with this object. In England it is not until the reign of Elizabeth that we possibly meet with the suggestion that red and blue coats were too conspicuous when campaigning in Ireland ; and even if a more sombre hue was then employed it was but for the time being. Not until towards the close of the last century was khaki adopted in the British army ; and the red trousers and dark blue coat of the French soldier, so conspicuous in contrast, were only discarded during the Great War. While it is only in modern times that a showy appearance has become a source of danger to the individual, bright colours with gleaming weapons and armour must have helped in the past to disclose the presence and movements of troops to the opponent ; and one can only suppose that the advantages of an inconspicuous dress and equipment were disregarded owing to the effect of display being deemed so all-important.

Finally, uniform has served to distinguish those of different rank ; to distinguish those of the same company, regiment, army, or nation ; and to distinguish the soldier from the civilian. While it is not to be supposed that tribal war-paint, totemic symbols, or the extra decorations

worn by chiefs were adopted for any such purposes, yet they unquestionably did serve as distinctions; and in the course of time were deliberately employed to enable those of the same company to keep together and rally round their chief.

The crests and emblems of mediæval Knighthood, though even then intended to affright the foe, served the same purpose; and it is from these that the modern regimental badge, and the extra decoration of the general's dress, are derived. Meanwhile in civilized countries the nation had replaced the tribe or clan as the main unit, and something extra was needed to denote nationality. Consequently we find each Christian nation bearing a Cross of different colour while the Saracen displays the Crescent. This distinction, however, would be useless during civil war; and so sashes and other special distinguishing badges were adopted in the Wars of the Roses, and those of Charles I and his Parliament. Later on the craze for a handsome and striking costume led to a great interchange of uniform in Europe, so that it cannot have been easy to tell friend from foe.

Formerly our military uniforms were borrowed from abroad, while other nations have copied our naval uniform; but of late there seems a tendency for other countries to adopt a costume much like our service dress, with "Sam Browne" belts for officers; and it seems not impossible that this may lead to trouble in the future. Since the Great War our Tank Corps has adopted the very distinctive Basque head-dress of the Chasseurs Alpins.

Lastly, uniform has served to distinguish the soldier from the civilian. After the incident in the Peninsular War narrated on p. 219, Vol. I, this matter next arose in 1870, when the Germans shot the French franc-tireurs. These had a *sort* of uniform, though it was only a blouse, a badge and sometimes a cap. They were not properly officered, and the German view (which in principle was accepted as correct) was that the franc-tireur could so easily divest himself of his uniform that it ought not to protect him. The Germans claimed that the marks

should be irremovable and distinguishable at rifle distance, and insisted on the absence of officers, etc.

The matter was discussed at Brussels in 1874 and at the Hague in 1899 and 1907. Chapter I of the Hague Convention of 1907 "on the qualifications of belligerents" reads as follows :

Article I. The laws, rights and duties of War apply not only to Armies, but also to Militia and Volunteer Corps fulfilling the following conditions :

1. To have at their head a person responsible for his subordinates.
2. To have a fixed distinctive emblem recognizable at a distance.
3. To carry arms openly.
4. To conduct their operations in accordance with the laws and customs of War.

Article II provides for the inhabitants of an invaded country resisting invasion by force, but makes no provision for any kind of distinctive dress or leadership so long as arms are carried openly and the customs and laws of war observed.

The German War-book, however, of which a translation was published in 1915, completely throws this over. Whilst admitting the right to defend one's country the War-book proceeds, "subjection to a responsible leader, a military organization and clear recognizability cannot be left out of account unless the whole recognized foundation for the admission of irregulars is going to be given up altogether, and a conflict of one private individual against another is to be introduced again with all its attendant horrors. . . . The disadvantages and severities inherent in such a state of affairs (insistence on leadership, organization and recognizability) are more insignificant and less inhuman than those which would result from recognition" (of Art. II of the Hague convention).

It appears, therefore, that the net result, as a matter of international law, is that nowadays there ought to be

leadership, organization and uniform, at all events to the extent of some recognizable and not easily laid aside emblem of military service.¹

Many examples of these uses of uniform occurred in the Great War.

Instead of suits of armour, we had the steel helmet and gas-mask and the body-armour sometimes employed in trench raids. In place of the Crusader's surcoat, we find the spine-pad and smoked goggles of Mesopotamia, over which an umbrella was sometimes carried by those who were exposed to the summer sun for any length of time. At the other extreme was the Arctic kit worn in North Russia. The importance of concealment led to camouflage, which developed into an elaborate art, and to the adoption of dresses of different colour for raids in the dark or snow. All our troops, from the general downward, being clad in service dress, distinctions of rank and regiment practically disappeared; and their want was quickly felt. Emblems were very soon adopted to distinguish formations, regiments and those in a position to give orders on different subjects. Many of these being heraldic—foxes' heads, the red and white rose, the maple leaf, etc.—closely resembled totemic emblems. Arm-bands, and gorget-patches of different colour or design, were employed for like purposes. Lastly there was an instance of the need for distinguishing friend from foe. Not long before the war, a blue-grey overcoat had been introduced for senior officers. This resembled in colour the German field-grey uniform, and there was a danger that the two might be mistaken; so the garment was promptly discarded and the khaki overcoat resumed.

I do not know of any case where uniform was improvised during the Great War to distinguish temporarily raised Corps from civilians on the battlefield, unless we count the Y.M.C.A. and the N.A.A.F.I., the latter of whom are now organized as a quasi-military body. But a recent instance of this nature is to be found in the black shirt adopted by the Fascisti in contradistinction to the red

¹ I am indebted to the late Sir A. Acland, Judge Advocate of the Fleet, for this account of International Law relating to the use of uniform.

shirt of the Garibaldini, which was originally worn because it was less conspicuous than darker shades when fighting on the open prairies of Montevideo. The Fascisti wear their black shirt on all occasions of ceremony, and it would seem that, if Italy were at war, it would entitle them to the rights of combatants under international law; for it is easily distinguished, being an unusual colour for such a garment, it is recognizable at a distance and not easily laid aside, and the Fascisti are properly officered.

Conclusion.

It will be seen that in its time uniform has helped in the make-up of many characters in the drama of war. Leadership, Patriotism, Esprit de Corps, Mass Discipline, Concealment, Recruiting have all borrowed it to some extent as a costume, though its main purposes have been to clothe Valour with its psychological properties and, with its physical properties, to envelop Defence in an impenetrable mantle.

During countless æons these latter were its chief uses. Then, after the invention of gunpowder, as fire-arms increased in accuracy and deadliness with successive improvements, armour was discarded. It was impossible to fight when carrying a weight of iron stout enough to protect oneself from a bullet. But now, after a lapse of two centuries, armour is being intensively revived. In this twentieth century of oil, a motive power has been discovered so potent in energy, weight for weight with the horse or even the steam engine, that the difficulty of reconciling resistance with mobility is being overcome. In the Tank we see once more the Knight in armour, with a machine-gun in place of a battle-axe, and a mechanical contrivance instead of a horse. Its steel plates are modern equivalents of the animal's skin in which our early forefathers clothed themselves for battle.

The immediate result of discarding protective clothing was to concentrate attention even more closely on the psychological properties of the soldier's dress, in which

it was now far simpler and cheaper to produce decorative effect ; and the century that followed the disuse of armour culminated in the picturesque garbs and head-dresses of the Napoleonic era.

This phase, however, had a comparatively short life. Soon afterwards the long-range rifle and gun appeared and battles were fought between antagonists whose distance apart continually increased. An imposing array produced no effect except at close quarters, and brilliant uniforms were replaced by drab colours to aid concealment.

Although in the revival of armour during and since the Great War history has repeated itself, it seems unlikely that we shall see any revival of uniform as a psychological factor on the field of battle, even though the womb of the future hold some secret leading to the renewal of single combat at close quarters.

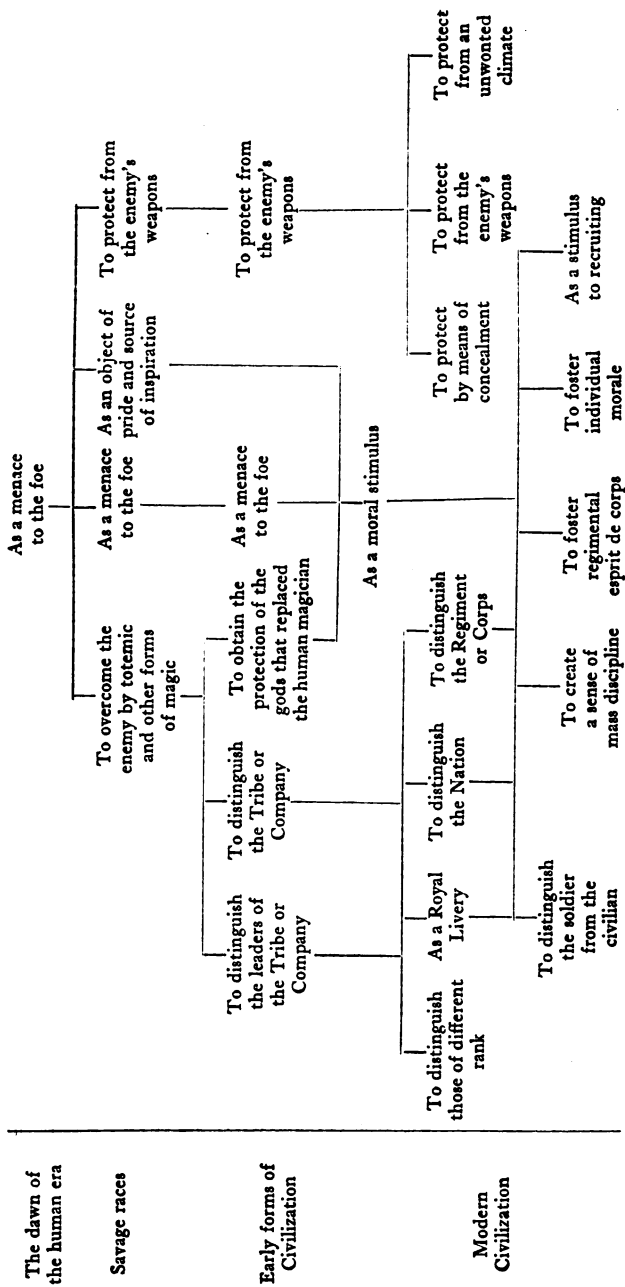
Though human nature may be unchangeable, there can be no doubt that, as man advances in civilization, he is less guided by crude emotion and more by intelligence. Omens and oracles are no longer consulted before going to war. The Angel of Mons notwithstanding, no portents are seen in the sky when some modern Cæsar is slain. Warfare in fact is losing all trace of romance and "is becoming as hopelessly intellectual and scientific as any other form of work ; officers are scientists, the men are workmen, the army is a machine."¹

Though instincts may still be the mainspring of all our actions, we are less hag-ridden by them ; they are becoming sublimated and directed to more refined ends. From the heady wines of fear and its companion rage have been distilled the purer essences of reverence and courage ; from sexual passion, love and sympathy.

The probability is that a brilliant uniform has disappeared for all time from the wardrobe of the stage of war, in common with much else that was spectacular in the battles of past ages ; and that it will appear in future only in the pageantry of peace.

¹ *The Great Illusion*—Norman Angell. He quotes General Bernardi who, in his work on cavalry, condemned the bad influence on tactics of the Pomp of War which he foresaw must disappear.

In conclusion, I have endeavoured to show graphically the numerous purposes which military uniform has served in the form of a genealogical tree ; but just as widely dispersed collateral branches of the same family might tend to reunite from a natural affinity, so in this case it is probably impossible to divide and sub-divide into any exact degree of relationship.



APPENDIX I

RED TAPE AND RAT-TRAPS

WITHIN 1000 miles of P—— was a store in which a large quantity of military clothing was kept, pending emergencies, and to keep down the rats there was a cat, for which a small subsistence allowance was drawn monthly. Retrenchment, however, was the order of the day, and the officer in charge was instructed to indent for “Traps, rat, wire, iron, galvanized, Mark I,” in the proportion of one to every 100 suits of clothing. In the next “changes in war matériel” an elaborate picture and description of the above trap appeared, and the cat was declared obsolete, and was ordered to be handed over to the Commissariat Department to be sold.

The number of traps, according to the above proportion, was found to be 19·3, and accordingly 20 traps were demanded.

The indent came back with one trap disallowed, but by way of consolation it was stated “that fractions of a trap exceeding ·5 would be considered as a whole trap.”

Thereupon the officer in charge of the clothing store pointed out that the odd 33 suits of clothing would be at the mercy of the rats, but without avail.

The 19 traps duly arrived, and a return, Army Form X 1063, was ordered to be submitted monthly.

The return in question was arranged in birdcage form, and was a masterpiece of its kind, showing at a glance the amount of clothing in store, the cubic measurement of each room, the number of traps on hand, and the number of rats caught each day. Mice were to be shown under “Remarks.” The percentage of rats caught to suits of clothing, and of rats to traps, was to be marginally noted.

As it was feared that the officer in charge of the clothing store might endeavour to take credit for mice as rats, the measurements of the animals caught were ordered to be inserted, and the officer in charge was authorized to demand “a suitable service measuring rod for the purpose.”

The officer in charge of the clothing store, anxious to show the keen interest he took in the matter, demanded “gauges, measuring cartridges and live shell,” which would enable measurements to be taken to $\frac{1}{1000}$ of an inch.

The authorities pointed out in reply that these gauges were fitted with gun-metal screws, and intended for measuring explosive articles only, “a condition *Presumably* not applying to rats,” and that their use with articles of a non-explosive character would therefore be “highly irregular if not dangerous,” and that the

operation must in any case be carried out under magazine regulations with felt slippers in an isolated building 400 yards from a road. "A plan of the locality was to be submitted."

An application that the term "live shell" might be extended to include live rats was rejected, and it was suggested that an ordinary 2-ft. rule would be sufficiently accurate for practical purposes.

This was accordingly demanded, but elicited the reply that "these stores formed part of chests, tool, carpenters', which were only allowed at stations for which carpenters' shops were authorized."

A strong case was accordingly made for the erection of a carpenter's shop, which was sanctioned at a cost of some hundreds of pounds.

Meanwhile the officer in charge of the store acknowledged the receipt of the traps, and requested instructions as to how they were to be set.

The reply came "that the matter had been under consideration, and instructions would shortly be published."

The first monthly return showed several suits of clothing destroyed by rats.

The authorities gave evidence of the energy they have always displayed on an emergency, and a very complete pamphlet was issued within a month, in which the mining of the iron, drawing out into wire, method of galvanizing, manufacture into traps, and system of inspection, testing and passing into the service, were exhaustively dilated on and profusely illustrated.

Nevertheless the second return was like the first.

"Were the instructions regarding setting of traps strictly carried out?"

"Yes; the clothing destroyed doubtless was part of that for which traps were disallowed," was the triumphant rejoinder.

Another trap was allowed, but "it was in contemplation to make a corresponding increase to the clothing in store of 67 suits."

The third return showed "rats caught *nil*," and more clothing destroyed.

A Mark II trap was introduced, which differed from Mark I in that the wire was not galvanized, and the iron was obtained in Germany.

No rats were caught, and further destruction of clothing.

"None but men of superior intelligence were to be permitted to touch the traps, and a warrant officer was to be struck off duty and detailed to instruct them. A return was to be submitted monthly, showing the number of men instructed."

In selecting the warrant officer the claims of a man who had caught bandicoots in India were ignored, and the opportunity of infusing fresh blood into this important service was neglected.

The grievance was duly aired in a weekly contemporary.

The worthy soldier who was selected, elaborated a drill in accordance with "the spirit of the instructions," which, after various extensionary motions to develop the trap-setting muscles, commenced with "take up traps," and ended with "ease springs."

Badges in gold and in worsted of crossed rats' tails were authorized for men who attained a certain stage of proficiency in trap-setting.

Still no rats were caught, and the destruction of clothing continued.

"The return showing number of men instructed was to be submitted in duplicate once a week."

Even this failed to produce an improvement.

It was suddenly discovered that the trap, though officially known as "trap, rat, wire, iron, galvanized, Mark II," was in fact made of ungalvanized iron. The responsibility for this blunder could not be brought home to anyone, but after some discussion the nomenclature was amended, and "changes in war matériel" were ordered to be at once corrected accordingly, and a certificate furnished.

The amendment was made retrospective, and past returns were ordered to be re-submitted. They were still found to be blank, and no improvement ensued.

The authorities were reluctantly compelled to admit "that the traps had not answered their expectations, and that there appeared to be no fault either in the traps themselves or the setting," and enquired incidentally what bait was used.

The officer in charge of the clothing store pointed out that no allowance was made for bait in the regulations, and that he could not be expected to provide it out of his own pocket.

In the end the cat was re-introduced into service, and was "to be strictly adhered to for the purpose of catching rats." The traps were ordered to be retained "for instructional purposes only."

APPENDIX II

A LIST OF THE PRINCIPAL MILITARY PUBLICATIONS CONSULTED
(EXCEPT WHERE STATED THESE ARE TO BE FOUND IN THE WAR
OFFICE LIBRARY)

Military Histories

Military Antiquities	Grose
Ancient Arms and Armour	Meyrick
History of the British Army	Fortescue
An epitomized History of the Militia ; The Constitutional Force	Hay
The British Army, its origin, progress and equipment	Scott
Cromwell's Army	Firth
Military Forces of the Crown	Clode
History of the British Standing Army, 1660- 1700	Clifford Walton
History of the Dress of the British Soldier	Luard
History of the Dress of the Royal Artillery	Macdonald
History of the Royal Regiment of Artillery	Duncan
History of the Corps of Royal Sappers and Miners	Conolly
Origin and Services of the Coldstream Guards	Mackinnon
Regimental Records of the Royal Scots	Leask & McCance
60 years of Military Administration, 1845- 1904 (manuscript)	Robinson

Reports of Committees and Commissions

Committee on army expenditure	1746
Commission to enquire into public accounts	1783
Finance reports to Parliament	1797/8
Commission of military enquiry	1808/12
Finance Committee on the Ordnance	1828
Committee on Army and Navy appointments	1833
Select Committee on Army and Ordnance expenditure	1849
Committee on the Army before Sebastopol	1855
Commission of enquiry on the supplies of the Army in the Crimea	1855
Select Committee on Contracts for Public Depts.	1856/7
Commission on stores and clothing depots at Weedon, the Tower and Woolwich	1859

Select Committee on Ordnance	1862
Report on the supply and transport of ammunition and stores for an army in the field	1862
Committee on the effect on the health of the present manner of carrying accoutrements, ammunition and kit	1871
Committee on the Transport and Supply Departments of the Army	1867
Committee on the conduct of business in army departments	1869/70
Committee on Reserve and Militia clothing	1872
Committee on the organization of the various military land forces of the country	1872
Committee on the Militia	1876
Royal Commission to enquire into the system under which patterns of warlike stores are adopted and the stores obtained and passed for Her Majesty's Service	1887
Committee on the organization and adminis- tration of the manufacturing departments of the Army	1887
Committee on Woolwich Ordnance Stores and accounts	1888
Committee of two Officers on Ordnance matters	1888/9
Army Clothing Committee	1890/91
Committee on the administration, custody and inspection of Ordnance and other stores	1891
Committee on Ordnance Store Writers	1893
Committee on the formation of an Ordnance department for the Army	1894
Committee on Reserves of guns and stores for the Army	1900
Committee on War Office organization	1901
Committee on clothing accounts	1902
Committee on the reconstruction of the War Office	1904

Arms and Ammunition

Official treatises and text books on guns, small
arms and ammunition of various dates since
the Crimea

Artillery, its progress and present position	Lloyd & Hadcock
Gunpowder and ammunition	Hime
The book of the rifle	Fremantle
Notes on small arms (MS. at R.A.O.C. Headquarters, Hilsea), 1866	Rawnsley

Orders and Regulations

Rules, orders and instructions for the Office of Ordnance	1683
Clothing warrants on dress details	1743/1800
Standing Orders and regulations for the Army in Ireland	1794
Army regulations	1795, 1807/57
General Regulations and orders for the Army	1822
Ordnance regulations, home and foreign	1823 & 1855
Instructions for Ordnance Commissaries in the Field	1827 & 1833
Regulations for Barrack Services and Barrack- masters	1838
Clothing Regulations	1857 and onwards
Ordnance Regulations	Various dates since the Crimea
Royal Warrants, circulars, general orders and memoranda	1856/66
War Office Circulars	1860/62 and 1864/66
Army circulars and general orders ; O'Byrne's collection	1867/79
Army Circulars	1880/81
Regulations for the provision of arms, accountrements, harness and saddlery	1865
Regulations for the Control Department	1870
Regulations for the supply of stores to an Army in the Field	1879
Royal warrant abolishing Control	30/1/1880
Order in Council placing the Ordnance Store Department under the C.-in-C.	1887
Army Order introducing Public clothing	6/12/1893
War Office memorandum No. 262 creating a consultative Board at the W.O.	1895
Army Order introducing Service Dress	January 1902
Army Order introducing the issue of clothing on payment	23/3/1908

Miscellaneous

Ordnance Bill Book (Public Record Office)	1654/58
Ordnance Journal (Public Record Office)	1664
Pay, Allowances and stoppages of privates of the line	1660 to 1871
Off-reckonings and expenses of clothing	1737 to 1813
War Office letter book (Public Record Office)	1763
Collection of Laws relating to the Ordnance	1774
Minutes of the Board of Ordnance (Public Record Office)	An immense collection
Adjutant General's letter books	1800/56
Report of Director of Clothing	1883
Pamphlet "Army Ordnance"	1901
Records of changes of pattern of clothing (Inspection branch R.A.C.D.)	1860 and onwards
Lists of changes of patterns of stores	1860 and onwards
Journals of the Society of Army Historical Research	

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